

PREVIOUSLY UNRECOGNIZED TYPES OF AMERICAN ACACIA SPECIES
FROM THE TORINO HERBARIUM (TO)

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ABSTRACT

Investigation of specimens for plants either native to or adventive in the New World and originally described as *Acacia* species, or later transferred to that genus, at the Herbarium Universitatis Taurinensis resulted in the location of previously unrecognized type materials for *Acacia adenanthera*, *A. alba*, *A. angico*, *A. bancroftiana*, *A. brasiliensis*, *A. compta*, *A. lasiopus*, *A. mollicoma*, *A. myriophylla*, *A. plumosa*, *A. pterocarpa*, *A. ramosissima*, *A. rubiginosa*, *A. spini*, and *A. velutina*. For *Acacia spini* Balb. ex de Spin, a neotype has been designated.

KEY WORDS: *Vachellia*, *Senegalia*, *Acacia*, *Mimosa*, *Piptadenia*, *Parapiptadenia*, mimosoid legumes, Fabaceae, Mimosoideae

RESUMEN

Investigaciones de especímenes de plantas tanto nativas como adventicias en el Nuevo Mundo y descrita originalmente como especies *Acacia*, o transferidas posteriormente a ese género, del Herbarium Universitatis Taurinensis resultaron estar en lugares de material tipo no reconocidas previamente de *Acacia adenanthera*, *A. alba*, *A. angico*, *A. bancroftiana*, *A. brasiliensis*, *A. compta*, *A. lasiopus*, *A. mollicoma*, *A. myriophylla*, *A. plumosa*, *A. pterocarpa*, *A. ramosissima*, *A. rubiginosa*, *A. spini*, y *A. velutina*. Para *Acacia spini* Balb. ex de Spin, se ha designado un neotipo.

The Herbarium Universitatis Taurinensis (TO) is a rich source of type materials for species that have been placed in the genus *Acacia*. In the process of identifying type materials for species originally described as *Acacia* sensu lato (s.l.) or at some time transferred to that genus, a search was made of herbarium materials of Colla, de Spin, and Martius at TO. Previously unrecognized probable and potential type materials were discovered. In order to put these findings into proper context, some historical background concerning the collectors, persons associated with the collections at TO, and the history of the herbarium are needed.

History of Herbarium Universitatis Taurinensis (TO)

The Herbarium of the University of Turin (TO) was established in 1891, about 160 years after the foundation of the Orto Botanico of the Università di Torino (1729), and is one of the most important Italian herbaria with about one million 1,000,000 specimens. In addition to two phanerogamic collections, *Herbarium Pedemontanum* (TO-HP, about 112,000 specimens) and *Herbarium Generale* (TO-HG, about 260,000 specimens), the Herbarium possesses several important collections, such as Carlo Allioni's herbarium, from which materials are not available for loan or exchange (Vignolo-Lutati 1951, 1952). These *exsiccata* or dried specimens document more than 250 years of botanical studies including those of the first floristic research in Piedmont (Piemonte), carried out by Carlo Allioni (1728–1804) and his collaborators (Allioni 1785), as well as several important early expeditions including that of Vitaliano Donati (1717–1762) to Egypt (1759–1762) (Forneris et al. 2008), H.R.H. Luigi Amedeo di Savoia, Duke of Abruzzi, to Ruwenzori (1906) and the Wabi Scebele in Ethiopia (1928–1929) (Mattiolo 1911; Forneris & Montacchini 1984; Guglielmone 2004).

A number of American collections of J.J. Bernhardt, L.A. von Chamisso and A.R. Delile, (North America), C. Bertero and F.W. Sieber (Antilles, South America), A.M.A. Bonpland (Central America), C.F.P. Martius and G. Casaretto (Brazil), from the early 1800s, including those are conserved in the herbaria of Giovanni Battista Balbis (18,000 specimens) and Luigi Colla (10,000 specimens) (Guglielmone et al. 2009; Baldini & Guglielmone 2012).

Giovan Battista Balbis (1765–1831)

Giovan Battista Balbis, a member of prestigious Italian and European Academies, was an important botanist of the 19th century; he was a correspondent with Augustin Pyramus DeCandolle, Jacques J. Labillardière and Kurt Sprengel, among others. Balbis was a student of Allioni; he graduated in medicine in 1785 and in 1794 he was a physician in Napoleon's Army in Italy. In 1801, Balbis was appointed Professor of Botany and Director of the University Botanic Garden in Turin, posts he held until 1814 when, after the defeat of Napoleon and the restoration of the Savoia monarchy, he was exiled. In 1819, Balbis served in the same role at the University of Lyon, where he remained until 1830, when his poor health obliged him to leave France and return to Piedmont. He died in early 1831 (DeCandolle 1831; Colla 1833; Stafleu & Cowan 1976:107–109; Forneris & Pistarino 1990). Although Balbis' studies involved the Italian and French flora [*Flora Ticinensis* (Nocca & Balbis 1816–1821)], written with the collaboration of Domenico Nocca (1758–1841), and *Flore Lyonnaise* (Balbis 1827–1828), between 1801 and 1814, he published 14 catalogs of the Botanic Garden of Turin and one of the Garden of Lyon in 1826. In these publications, he added the descriptions of some new species that were cultivated in the Gardens. Under his direction, the number of species cultivated in the Botanic Garden of Turin increased considerably. In 1801, there were more than 3,500 species, but in 1812 this number had grown to about 6,000 (Balbis 1801; 1812; 1813). Under his direction, there was an increased interest in exotic flora and the focus of the institution expanded from the geographic limits of the Piedmont region to a worldwide perspective. New greenhouses were built, where many plants from Africa and America were cultivated; for some of these species this represented the first introduction into Italy (Saccardo 1909; Maniero 2000). Many of these collections were obtained by personal exchanges with other Italian and European botanists and either University or private Gardens. The richness of plants cultivated in the Botanic Garden is documented by the drawings collected in *Iconographia Taurinensis* (Forneris 2008). This collection, 7640 drawings in 64 volumes, represents plants cultivated in the Garden between 1752 and 1868, the year when the last painter died (see Chiapusso Voli 1904). Many plants cited in the Balbis' catalogs are included in volumes 35 to 47 of this series (Forneris 2008).

Balbis made a remarkable herbarium, considered one of the most important of the time; the collection includes the plants he collected as well as specimens obtained in exchange from other botanists. In 1831, after Balbis' death, his herbarium was bought by Giuseppe Giacinto Moris (1796–1869), director of the Botanic Garden in Turin. Because the University did not hold a collection of dried specimens (*exsiccata*) at that time, Balbis' materials were the first holdings of the current herbarium (Mattiolo 1929).

Carlo Giuseppe Luigi Bertero (1789–1831)

Carlo Giuseppe Luigi Bertero, a correspondent and close friend of Balbis, was one of the first Italian naturalists to visit the New World, collecting a large amount of botanical material from little known areas. Bertero was born on 14 October 1789 in Santa Vittoria d'Alba (Piedmont, near Turin). He studied Medicine at the University of Turin, where he attended lessons of botany at the Botanic Garden by Balbis. After his graduation in 1811, he practiced the medical profession for several years.

In 1816, Bertero moved to Paris where he met many important botanists such as René Louis Desfontaines, Jean Louis Loiseleur-Deslongchamps and, especially, Christiaan Hendrik Persoon; this botanist helped him in studying the Flora of the Antilles and assisted him in obtaining an appointment as a ship's doctor on the ship *Guadelupe*, which sailed for Martinique in August 1816.

The details of this first expedition results were carefully recorded in Bertero's manuscript, a field book in which he wrote about the localities visited and the plants observed, about his correspondence with Balbis and Colla, and about his collections. These documents trace the following itinerary: Guadeloupe (1816–1818),

Saint Thomas (1818), Puerto Rico (1818–1819), Santo Domingo, Haiti (1819–1820), Colombia (Santa Marta, Barranquilla, Mompós and part of Rio Magdalena) (1820–1821), and Jamaica (1821) (see also Urban 1902).

In 1821, Bertero returned to Paris, but later returned to Turin where he met with Balbis in order to study his new collections. Balbis sent many of Bertero's specimens to Kurt Sprengel in Berlin for identification, but Bertero's field book was sent to A.P. DeCandolle in Geneva; in this field book, 1746 species are cited; most of these are described and the morphological details illustrated. DeCandolle (1825) included descriptions of the new Caribbean taxa reported by Bertero in his *Prodromus*. In 1857, Alphonse DeCandolle returned Bertero's manuscript to Turin. At present, the largest part of Bertero's collections from the West Indies and Colombia, about 2,000 taxa, is conserved at TO in Balbis' and Colla's collections. Duplicates of Bertero's material are also found in other herbaria including B, FI, HAL, L, M, MEDEL, MO, MPU, NY, P, P-JU, S, WB.

In 1827, Bertero returned to Paris where he planned his next expedition to Chile, following the suggestions made by A.P. DeCandolle and Benjamin Delessert to explore a land for which the flora was poorly known. In October 1827, he embarked on a ship from Le Havre to Valparaiso, Chile, again as a ship's doctor. Reconstruction of this second journey is complex: data about the itinerary are based only on specimen labels and Bertero's correspondence with Balbis and Colla. The Chilean localities visited include: Valparaiso, Rancagua, Quintero, M.te La Leona, M.te la Punta des Cortes, Quillota, Tagua Tagua lagoon, Concoa River, Rio Claro, and Cachapoal.

In 1828–1829, Bertero published a list of several species he had observed in the newspaper *Mercurio Chileno*. In this list, he proposed several new species, but unfortunately because he did not add descriptions, these epithets are *nomina nuda*. In early 1830, Bertero went to the Juan Fernández Islands (Isla Mas a Tierra) with the English botanist A. Caldeleugh. On September 28, 1830, Bertero sailed from Chile to the Society Islands with the General Consul of North America J.A. Morenhout and on November 4, 1830, he arrived in Tahiti, where he collected plants actively for a few months. He departed on April 9, 1831, for Valparaiso, but died in the shipwreck of his boat near Raiatea island (for detailed information about Bertero's biography see: Mattirollo 1932; Vignolo-Lutati 1955, 1956; Delprete et al. 2002).

Before his final unlucky voyage, Bertero sent his Chilean collections to Baron Delessert in Paris who distributed duplicate sets of *exsiccatae* to Balbis, Colla, and A.P. DeCandolle, but kept back the rest of these collections (about 15,000 specimens) for Bertero. Several years after Bertero's death, these were sold by Delessert's heirs to a Travel Company of Esslinger owned by E. Steudel and C.F. Hochstetter (1840); later these materials were dismantled and dispersed. Bertero entrusted his Tahitian collection to Morenhout, who in 1834 sent these materials to A. Dessalines d'Orbigny in Paris, although by that time, a portion of this material was missing (Guillemin 1836, 1837). Despite the fact that J.A. Guillemin reported that some duplicates were sent to the Royal Academy of Turin, no Bertero specimens from Tahiti were conserved in Turin. At the present time, Bertero's Chilean material (about 300 specimens) are found in Colla's herbarium.

Luigi Colla (1766–1848)

Luigi Colla was a lawyer and an expert botanist whose botanical knowledge was appreciated by the most important botanists of that time. A.P. DeCandolle, J. Lindley and K. Sprengel, named new genera after him. Colla was a member of prestigious Italian and European academies; in 1822, he even became a member of the Academy of Natural History of Philadelphia. These affiliations permitted him to have many correspondents with whom he made exchanges of plants and *exsiccata*. Colla published several works in the *Memorie della Reale Accademia delle Scienze di Torino* between 1820 and 1848, including monographs of exotic genera such as the genus *Musa*, which included the description of two species, *Musa balbisiana* and *M. acuminata* (Colla 1820). Colla established a botanic garden in Rivoli (near Turin), the *Hortus Ripulensis*, for which he published catalogs of plants cultivated between 1824 and 1831 (Colla 1824, 1827a, 1827b, 1829, 1831). In these catalogs, Colla also reported descriptions of new species, often with the respective drawings made by his daughter Tecofila Colla Billotti. In 1829, the number of species cultivated in the garden increased to more than 2000 species belonging to approximately 700 genera (Colla 1831): the greatest part of these were exotic and included a number of plants obtained from seeds sent by Bertero from the Antilles.

Colla was a close friend of Bertero and, after Bertero's death, Colla published descriptions of the new Chilean genera and species based on Bertero's specimens collected during the second expedition, including those listed by Bertero in 1828–1829 in the *Mercurio Chileno*. In 1834, Colla (1834a) published a paper entitled “Plantae rariores in regionibus Chilensibus a clarissimo M.D. Bertero nuper detectae”, in which he described several new taxa; he again published the same description for some of these species in another work, *Herbarium Pedemontanum* (Colla 1833–1837) (for more details about the priority of publications see Pichi-Sermolli 1951, 1952). In both works Colla enclosed drawings of new taxa made by his daughter. Two more species from Bertero's *exsiccata* were published by Moris (1834, 1835).

Colla's herbarium included about 10,000 specimens; this collection includes *exsiccata* obtained from the plants grown in his botanic garden, Bertero's expeditions, and exchanges with several Italian and European botanists including specimens from Giovanni Biroli (1772–1825) from Piedmont (Guglielmone, 2008), Jacob Corinaldi (1782–1847), from Egypt (Forneris et al. 2008), Carl Friedrich Philipp von Martius (1794–1868) from Brazil (Fryxell 1976; Stafleu & Cowan 1981:325–339), and Maximilian A.P. von Wied-Neuwied (1782–1867) (P.L.R. de Moraes, personal communication). On April 25, 1849, after Colla's death, his son donated his collection to the University of Turin; the catalog of this herbarium, handwritten by Colla himself, accompanied the specimens (for more detailed information about Colla's biography see: Parlato 1850; Delponte 1852; Mattiolo 1929:44).

Marquis Luigi Raimondo Novarina di Spigno (1760–1832)

Marquis Luigi Raimondo Novarina di Spigno (1760–1832), known as Marquis De Spin, was a passionate botanist who established an important garden in San Sebastiano Po (near Turin) at the beginning of the 19th century. Bertero sent the seeds of several species from the Antilles to De Spin, who listed the species present in his garden in seven catalogs published between 1804 and 1823. He exchanged living plants and *exsiccata* with several correspondents, among these were Balbis and Colla. The international relationships that he maintained allowed a constant and conspicuous increment of the species grown in the San Sebastiano garden; moreover he acclimatized and introduced into cultivation several exotic species that were subsequently sent to many Piedmont gardens.

De Spin acknowledged his gratitude to Bertero for the seeds, material and information obtained from him through Balbis in his catalog of 1823. De Spin prepared specimens from several plants in his garden. Approximately 700 specimens based on Marquis' living collections, now mostly included in Balbis' herbarium, have been identified in TO (for more detailed information about De Spin biography and collection see: Guglielmone et al. 2006).

History of *Acacia*

As conceived by Willdenow (1806, 1809), Kunth (1823, 1825), DeCandolle (1825) and other early taxonomists, the genus *Acacia* was quite diverse; many of the species now belong to other genera of mimosoid legumes, among them *Mimosa* (Barneby 1991), *Calliandra* (Barneby 1998), *Pithecellobium*, *Albizia*, and *Lysiloma* (Barneby & Grimes 1996, 1997). Based largely on the concepts of Bentham (1842, 1875, 1876), the genus *Acacia* later was limited to species with numerous stamens (20–200) and filaments free to the base. This concept remained largely the same until the 20th century when Vassal (1972) and Pedley (1978) refined the subgeneric treatment of this rather large genus. Pedley (1986) suggested that the genus *Acacia* should be divided into three genera, *Acacia*, *Senegalia*, and *Racosperma*. Nonetheless, most workers continued to accept *Acacia* s.l. until Maslin et al. (2003) suggested that the time had come to depart from this viewpoint.

The taxonomy of *Acacia* became more contentious when in 2005, the International Botanical Congress in Vienna approved a proposal to change the type of the genus *Acacia* Miller from an African species, *A. scorpioides* (L.) W.F. Wight [= *A. nilotica* (L.) Delile; *Acacia* subgen. *Acacia*] by recognizing an Australian species *A. penninervis* [*Acacia* subgen. *Phyllodineae*] as a conserved type (Orchard & Maslin 2003; McNeill et al. 2005). Acceptance of this retypification remains controversial (Brummitt 2011; Linder & Crisp 2011; Luckow et al. 2005; Moore & Cotterill 2011; Moore 2007, 2008; Moore et al. 2011a; Moore et al. 2011b; Rijckevorsel 2006;

Smith & Figueiredo 2011; Smith et al. 2010; Smith et al. 2006; Thiele et al. 2011). However, the retypification was upheld recently at the XVIII International Botanical Congress in Melbourne (McNeill & Turland 2011; Smith & Figueiredo 2011).

Apart from these arguments, both morphological and molecular data for *Acacia* s.l. (Acacieae), Ingeae, and Mimoseae, strongly support segregation of *Acacia* s.l. into at least five entities: the genera *Vachellia* (Seigler & Ebinger 2005; Kodela & Wilson 2006), *Senegalia* (Seigler & Ebinger 2009, 2010; Seigler et al. 2006a), *Acaciella* (Britton & Rose 1928; Rico-Arce & Bachman 2006), *Mariosousa* (Seigler et al. 2006b), and *Acacia* (primarily Australian species of the former subgenus *Phyllodineae*).

Acacia specimens in TO

A number of types or possible type material for American species of *Acacia* is found at TO, although many of these are now recognized as members of other genera. Others were originally described in other genera, but were later considered to be members of *Acacia* s.l. There are approximately 500 specimens of *Acacia* presently assigned to 198 taxa in the "Herbarium Generale." Several of these are included in the collections of herbaria of Balbis and Colla.

Although Balbis listed 164 specimens of *Acacia* in the catalog of his herbarium, only 117 are presently found in the collection; among these are 36 specimens sent by Bertero from Guadeloupe in 1819, Santo Domingo and Puerto Rico in 1820, and Santa Marta (Colombia) and Jamaica in 1821. Dates on the labels refer to the years when Balbis received the specimens (Vignolo-Lutati 1955). There are also eight specimens from the Botanic Garden of Turin (between 1800 and 1813) and six from De Spin's garden (between 1818 and 1825) (the Marquis listed 47 species of *Acacia* in his catalogs).

The catalog of Colla's herbarium includes 104 *Acacia* specimens; presently only 96 are found. Among these, nine specimens from "Herbarium Martii," probably represent duplicates of Martius' collections; six of these likely came from collections of von Wied-Neuwied (P.L.R. de Moraes, personal communication). There are also 36 specimens cited in *Hortus Ripulensis*; Colla listed 50 specimens of *Acacia* in the catalogs of his garden. Thirty-four more *exsiccata* are from the West Indies with labels handwritten by Bertero.

A careful search of materials at TO reveals specimens associated with many of the historically important figures outlined above, that are either original materials examined by these botanists, or in a number of cases type materials. Most of these specimens have not been considered in recent taxonomic studies involving mimosoid legumes. The status of these *exsiccata* is discussed below:

TYPES OR ORIGINAL MATERIALS OF ACACIA SENSU LATO AT TO

- 1. *Acacia adenanthera*** Schult. ex Colla, 1834. Herb. pedem. 2:266, n. 71. (**Fig. 1**). Nom. illeg. non Zeyh. ex Steud. (1821).

Specimens examined: Two labels: "*Acacia adenanthera* / ex H. Rip. 1824 8^r [= october] e semin: missis a / Schultesio, hoc anno n: fl: [= nondum floruit];" "*Acacia adenanthera*," both labels hw. Colla, TO-HG, herb. Colla.

Neither flowers nor fruits are mentioned in the original description; the country of origin is not known. The specimen lacks prickles and spines; the leaves are bipinnate with 2–3 opposite pairs of pinnae and 12 pairs of leaflets per pinna. The rachillae of the pinnae are winged. The leaflets are opposite with more or less central venation (Fig. 1). Colla (1834b 2:266, n. 71) notes that there is a gland at the base of the petiole. The gland appears to be flattened and ovate in outline. This specimen is not an *Acacia* s.l., but appears to be a mimosoid legume. We cannot identify it to genus.

The collector was probably Joseph August Schultes (1804–1840), a botanical collector for Roemer or his father Julius Hermann Schultes (1773–1831), an Austrian botanist in Brazil. Most of their collections were in northeastern Brazil, especially Pernambuco.

- 2. *Acacia alba*** De Spin, Le Jardin de St. Sébastien soit Catalogue 27. 1818. (**Fig. 2**). Nom. illeg. non Willdenow (1806), *Calliandra alba* (Colla) Benth. ex Jackson, Index Kew. 1:385. 1895.

Notes.—The name *Acacia alba* is treated as a heterotypic synonym of *Zapoteca portoricensis* (Jacq.) H.M. Hern. var. *flavida* H.M. Hern., Ann. Missouri Bot. Gard. 73:758. 1986. Country of origin not known.

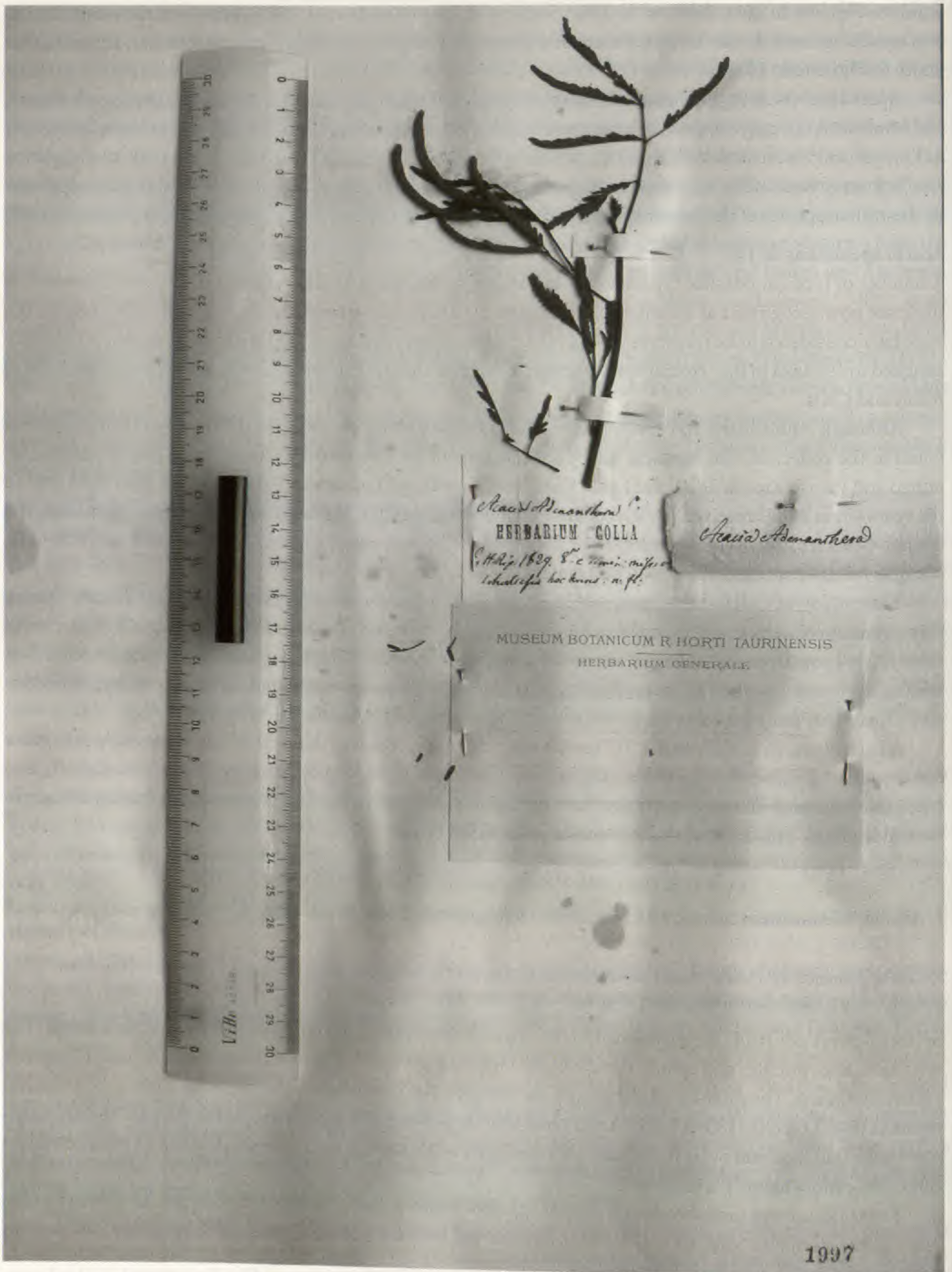


FIG. 1. Original materials of *Acacia adenantha* Schult. ex Colla.



FIG. 2. Original materials of *Acacia alba* De Spin.

Specimens examined: Two labels: "Acacia alba W. / ex H. Ripul. 1829 8^r in calid. / raro floret;" "Acacia alba," both labels hw. Colla, TO-HG, herb. Colla.

The species was listed and described in the catalog of S. Sebastiano garden (De Spin 1818, pp. 5, 27, note 1). Moreover, it is described in the second appendix to the catalog of *Hortus Ripulensis* (Colla 1827b:339, note 1); the plant was received from a garden sited in Buttigliera (on the hills near Turin) owned by Count Francesco Lorenzo de Freylino (1758–1820) and at that time directed by M. Pangella. This garden was very important in the 18th century, particularly for the collections of exotic plants. In the three catalogs of the garden (Freylino 1785, 1808, 1810) this species was not listed. Colla (1834b 2:362, n. 33) also cited this species. This species was early accepted (Steudel 1841, Bentham 1875; for complete descriptions and distribution see Barneby 1998; Barneby & Grimes 1996; Hernández 1986, 1989; Zuloaga 1999).

3. *Acacia angico* Mart. in Colla, *Herb. pedem.* 2:268. 1834. (**Fig. 3**). *Senegalia angico* (Mart. in Colla) Seigler & Ebinger, *Phytologia* 92:91. 2010. TYPE: BRAZIL: Villa Nova (LECTOTYPE, here designated: TO; ISOLECTOTYPES: BM, K, P).

Specimens examined: Two labels: hw. Martius, "Acacia angico Mart. / Villa Nova Brasil / Communic. Martius 1827;" hw. Colla, "Acacia angico;" TO-HG, herb. Colla ex herb. Martius.

Although Colla's handwritten label confirms the earlier name *Acacia angico* on the label written by Martius, the description (Colla 1834b) agrees more closely with the type of *Acacia plumosa* Martius in Colla. Because Colla did provide a Latin binomial and at least a generally accurate description and diagnosis, *Acacia angico* was validly and effectively published. Further, the specimen at TO represents materials seen by Colla and we designate that specimen as a lectotype for the species. Because the name of the species follows the type specimen, not the accuracy of the description, that name must be accepted.

Bentham (1876) considered *Acacia angico* Martius to be a synonym of *Piptadenia rigida* Bentham (1842) [now recognized as *Parapiptadenia rigida* (Benth.) Brenan (1963)] suggesting that Bentham was influenced by Colla's descriptions, although Colla was not cited. A Martius specimen of authentic *Acacia angico* at Kew (K264972), labeled as such in Martius' handwriting and apparently identical to material seen by Colla at TO was annotated by Bentham as *Acacia plumosa* Lowe. The descriptions of other authors are often based on erroneously interpreted materials of *Acacia angico* Martius in Colla (Boggan et al. 1997; Rico-Arce 2007; Barneby et al. 2007).

4. *Acacia bancroftiana* Bertero ex Colla, Hortus Ripulensis 1. 1824. (**Fig. 4**, upper left specimen). TYPE: JAMAICA. "1693 / Acacia Bancroftiana Bert. / Jamaica 1821 Majo" (LECTOTYPE, here designated: TO; ISOLECTOTYPE: G-DC).

Notes.—The name *Acacia bancroftiana* is currently treated as a heterotypic synonym of *Caesalpinia vesicaria* L., 1753. *Sp. pl.* 1:381.

Specimens examined: hw. Balbis, "Acacia bancroftiana / Bertero / e Jamaica D. Bert.," TO-HG, herb. Balbis; left, hw. Bertero, "1693 / Acacia bancroftiana Bert. / Jamaica 1821 Majo / ... [unreadable letters]," TO-HG; right, hw. Bertero, "Acacia bancroftiana Bert. / Jam. 1821 Jul.," TO-HG; hw. Bertero, "Acacia bancroftiana / Bertero / Jamaica frutiulis;" TO-HG.

This species was listed in the catalog of San Sebastiano garden (De Spin 1823) and described by Colla (1824:1, note 2). In 1821, Bertero (1816–1821) recorded the description of the species in his fieldbook, in fascicle 13 of "Stirpes in Provincia S. Marthae Continent. Amer. Austral. Lectae 1821" (pp. 1042–1043, n. 1693). The four specimens can be considered as syntypes. Sample 2a reports the original collection number by Bertero and is selected as the lectotype (Fig. 3). This species is discussed in more detail by subsequent authors (DeCandolle 1825; Mabberley 1981; Rico-Arce 2001).

5. *Acacia brasiliensis* Colla, Mem. Reale Accad. Sci. Torino 33(1):135. 1829. (**Fig. 5**). Nom. illeg. non Sprengel (1826). *Acacia brasiliensis* Spreng., *Syst. veg.* 3:142. 1826. = *Calliandra* sp.

Notes.—According to Bentham (1875), based on the imperfect diagnosis, Sprengel's material of *Acacia brasiliensis* may not be distinct from *Calliandra bella* (Mart. ex Spreng.) Benth., *London J. Bot.* 3:110. 1844.

Specimens examined: Two labels: "Acacia brasiliensis / ex H. Ripul. 1820 / Spr. III. 42 125 non quadrat / ... [unreadable word] enim aculeata;" "Acacia brasiliensis?"; both labels hw. Colla; TO-HG, herb. Colla.

The specimen was from a plant cultivated in the garden owned by the Litta family in Lainate (near Milan) and given to Colla by the gardener Giuseppe Tagliabue. The species was described in the third appendix of *Hortus*

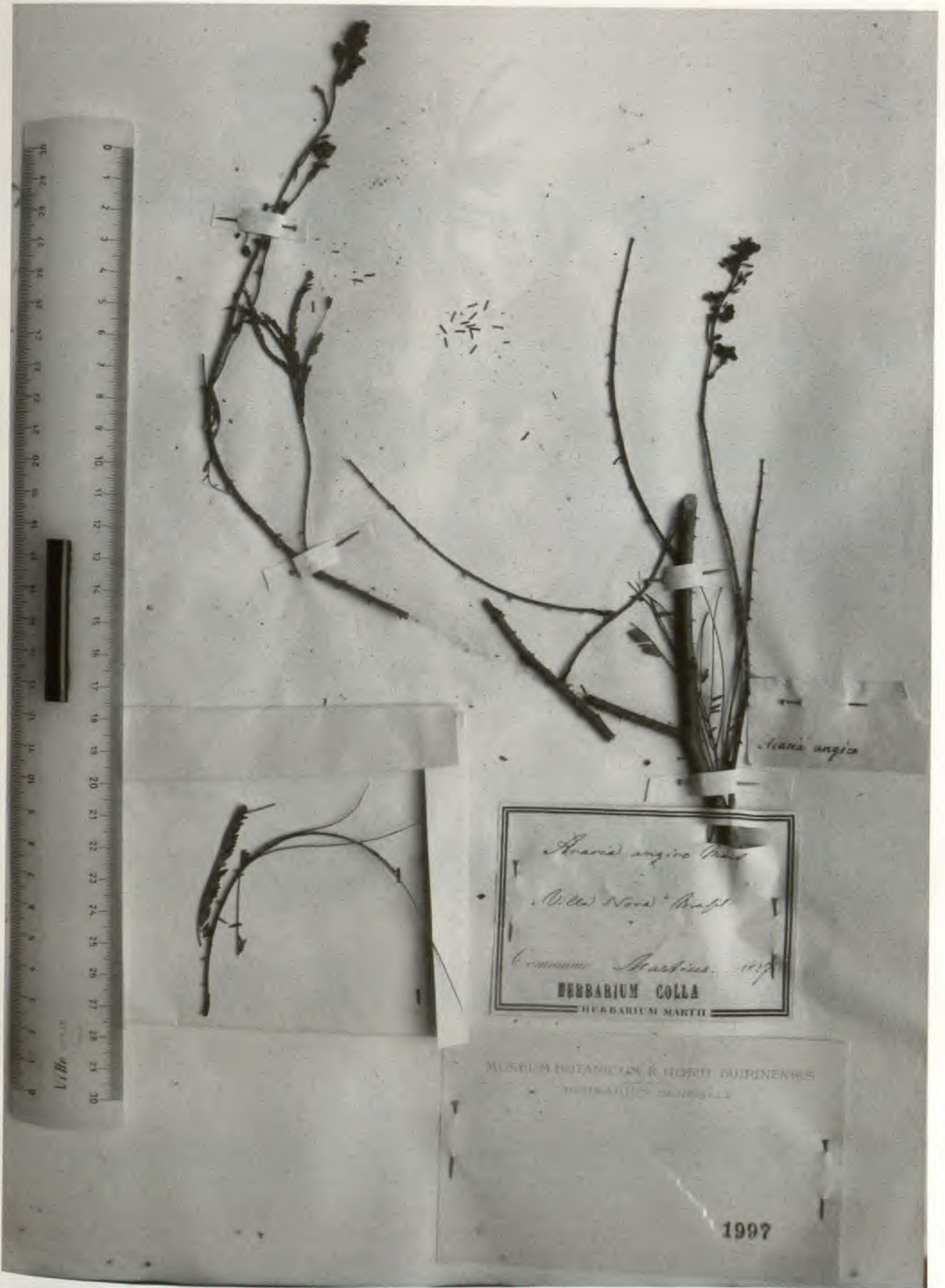


FIG. 3. Lectotype of *Acacia angico* Mart. in Colla.



1693.
 Acacia Bancroftiana Bart.
 Jan 1871 juv.
 Sp. Led.
 2075
 K.
 H. Cham.
 R.C. Brown

MUSEUM BOTANICUM R. HORTI TAURINENSIS
 HERBARIUM GENERALE

Acacia Bancroftiana Bart.
 Jan 1871 juv. 1997

FIG. 4. Lectotype of *Acacia bancroftiana* Mart. ex Colla (upper left).

Ripulensis (Colla 1829:135, note 1) and listed in *Herb. Ped.* (Colla 1834b, 263, n. 47). Colla reported that the plant has two glands on the petiole (Colla 1829:135, note 1), but we were unable to observe petiolar glands on the specimen examined. A drawing of this species was found in *Iconographia Taurinensis* (Vol. 51, t. 16); the volume is estimated to be dated between 1829 and 1831 (Forneris 2008). These characters are compatible with the genus *Mimosa*.

6. *Acacia compta* Mart. in Colla, *Herb. pedem.* 2:268. 1834. (**Fig. 6**). TYPE: BRAZIL: "Acacia compta Mart. / S. Pedro d'Algoa Brasil / communic. Martius 1827," (LECTOTYPE, here designated: TO).

Notes.—Present status unknown.

Specimens examined: Two labels: hw. Martius, "Acacia compta Mart. / S. Pedro d'Algoa Brasil / communic. Martius 1827;" hw. Colla, "Acacia compta," TO-HG, herb. Colla ex herb. Martius.

The flowers of the spicate inflorescences have 8–10 stamens. The leaflets have subcentral venation with conspicuous venation on the adaxial side. The prickles are paired at the nodes (Fig. 6). There is a small gland at the base of the petiole (Colla 1834b). These characters are compatible with *Adenopodia*, *Mimosa* or most probably a *Piptadenia* species. The specimen conserved in TO-HG is evidently part of the type material. There is no indication that the specimen in TO was the only material used by Martius, thus it is not considered as the holotype, but designated as the lectotype (ICBN art. 9 note 1).

7. *Acacia lasiopus* Mart. in Colla, *Herb. pedem.* 2:267, n. 74. 1834. (**Fig. 7**). TYPE: BRAZIL: "Acacia lasiopus Mart. / Ad Fl. Ilheos Brasilia / Communic. Martius 1827" (LECTOTYPE, here designated: TO). No type materials seen at M in 2007.

Notes.—The name *Acacia lasiopus* is possibly a *Senegalia* species.

Specimens examined: Two labels: hw. Martius, "Acacia lasiopus Mart. / Ad Fl. Ilheos Brasilia / Communic. Martius 1827;" hw. Colla, "Acacia lasiopus;" TO-HG, herb. Colla ex herb. Martius.

The flowers of this specimen have approximately 50 stamens. According to Colla (1834b), the leaves have 4–6 pairs of elliptic leaflets and the species is eglandular. This specimen appears to be a mimosoid legume of tribe Ingeae, but the paucity of characters does not permit further assignment of this taxon.

8. *Acacia mollicoma* Mart. in Colla, *Herb. pedem.* 2:267, n. 73. 1834. (**Fig. 8**). TYPE: BRAZIL: "Acacia mollicoma Mart. / Campos Novos Brasil / communic. Martius 1827" (LECTOTYPE, here designated: TO). The specimen was sent by Martius. No type materials seen at M in 2007.

Notes.—Possibly *Parapiptadenia rigida* (Benth.) Brenan, but not *Acacia* s.l. species.

Specimens examined: Two labels: hw. Martius, "Acacia mollicoma Mart. / Campos Novos Brasil / communic. Martius 1827," / hw. Belli, corrected "Acacia mollissima;" hw. Colla, "Acacia mollicoma" / signed "non iuste" / Belli; TO-HG, herb. Colla. Saverio Belli (1852–1919) was the director of the Botanic Garden of Turin between 1898 and 1900.

Although Colla (1834b) states that there are no petiolar glands, they are evident on the specimen itself. Campos Novos is in current-day Sta. Catarina. Based on Burkart (1979), this specimen, which is unarmed (Fig. 8), may be *Parapiptadenia rigida* (Benth.) Brenan, which has been collected there in recent years. Perhaps other genera of tribe Mimoseae should be considered as well.

9. *Acacia myriophylla* Mart. in Colla, *Herb. pedem.* 2:266, n. 72. 1834. (**Fig. 9**). TYPE: BRAZIL: "Acacia myriophylla Mart. / Cap. Frio, near Rio de Janeiro, Brasil / communic. Martius 1827" (LECTOTYPE, here designated: TO). No type materials found at M in 2007 (Colla 1837).

Notes.—Possible *Piptadenia* or *Mimosa* species; not a member of *Acacia* s.l.

Specimens examined: Two labels: hw. Martius "Acacia myriophylla Mart. / Cap. Frio Brasil / communic. Martius 1827;" hw. Colla, "Acacia myriophylla;" TO-HG, herb. Colla.

The specimen conserved in TO-HG is evidently part of the type material. There is no indication that the specimen in TO was the only material used by Martius, thus it is not considered as the holotype but designated as a lectotype (ICBN art. 9 note 1).

Colla (1834b) described this species and enclosed a drawing made by his daughter (Colla 1837, tab. 62, fig. 1). He noted that there are no (petiolar) glands and that the plant is unarmed. The number of stamens (10

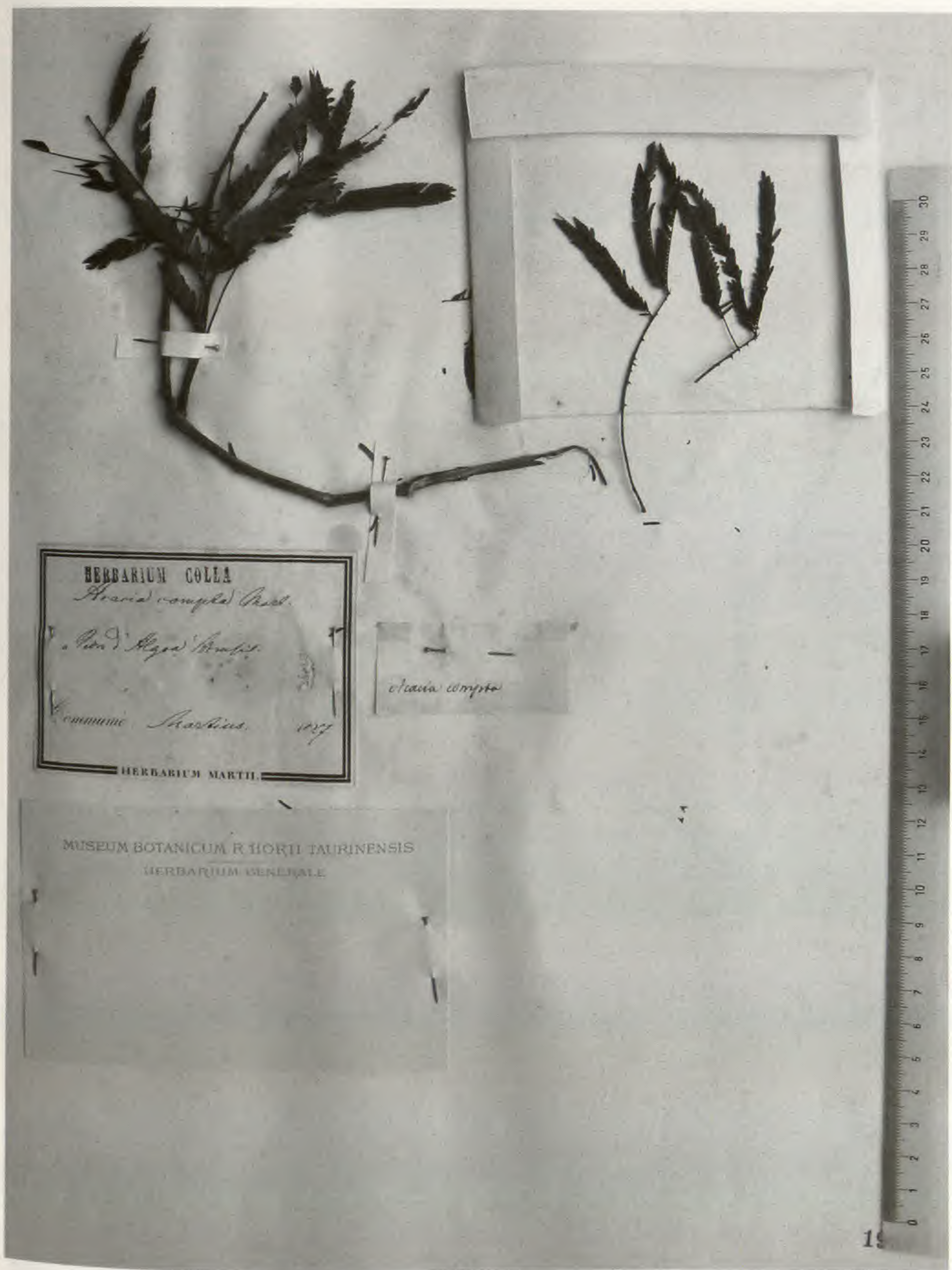


FIG. 6. Lectotype of *Acacia compta* Mart. in Colla.

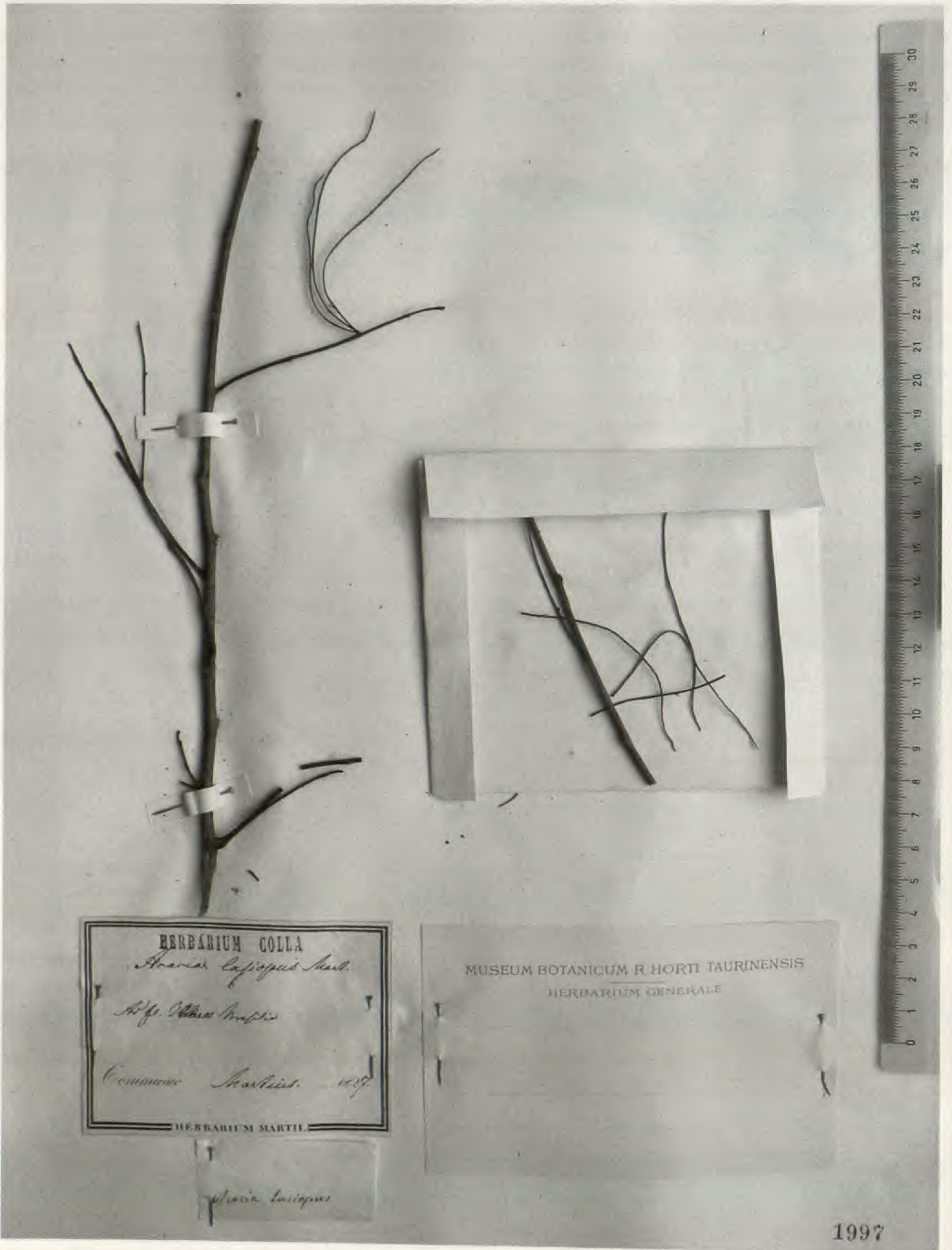


FIG. 7. Lectotype of *Acacia lasiopus* Mart. in Colla.

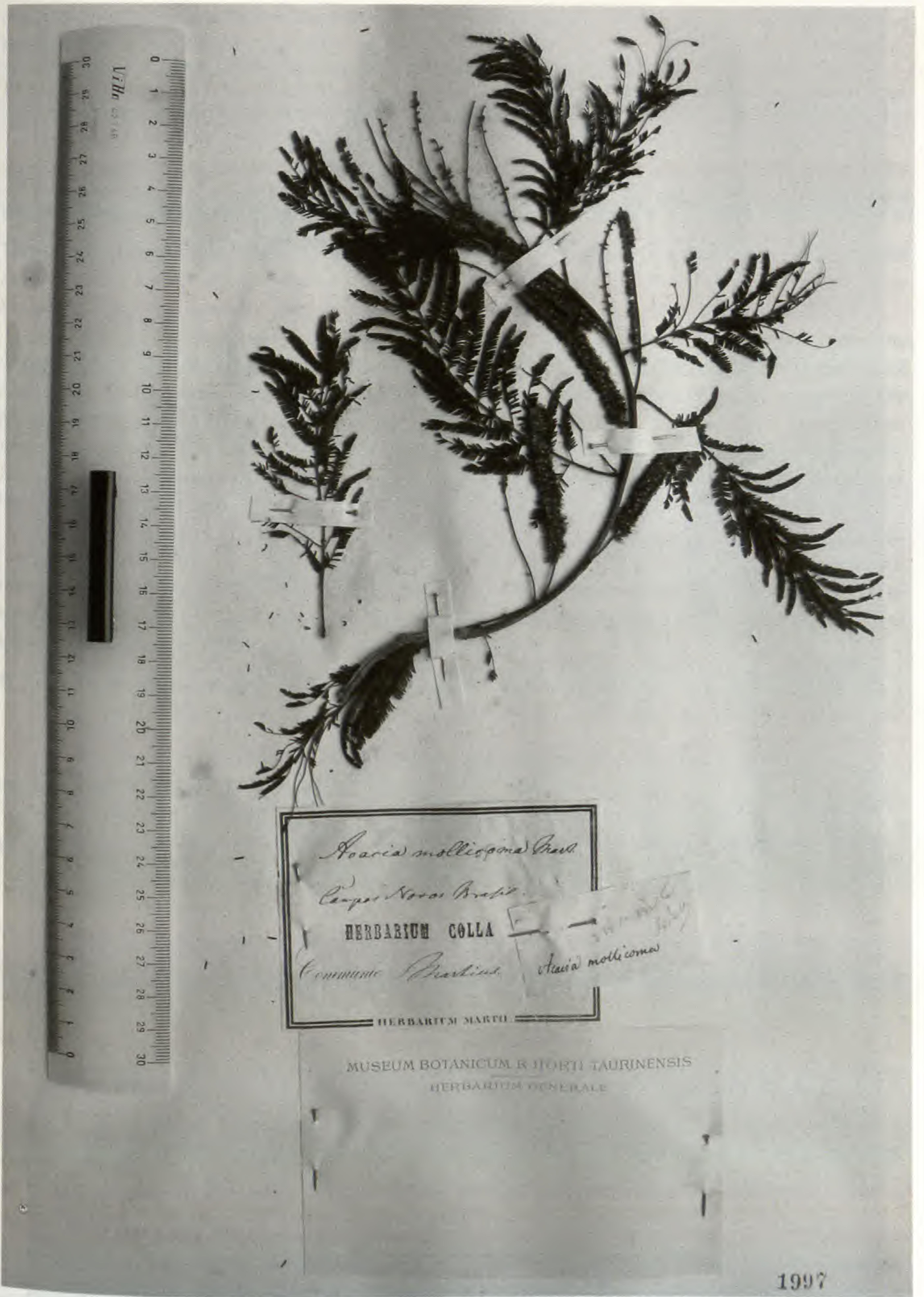
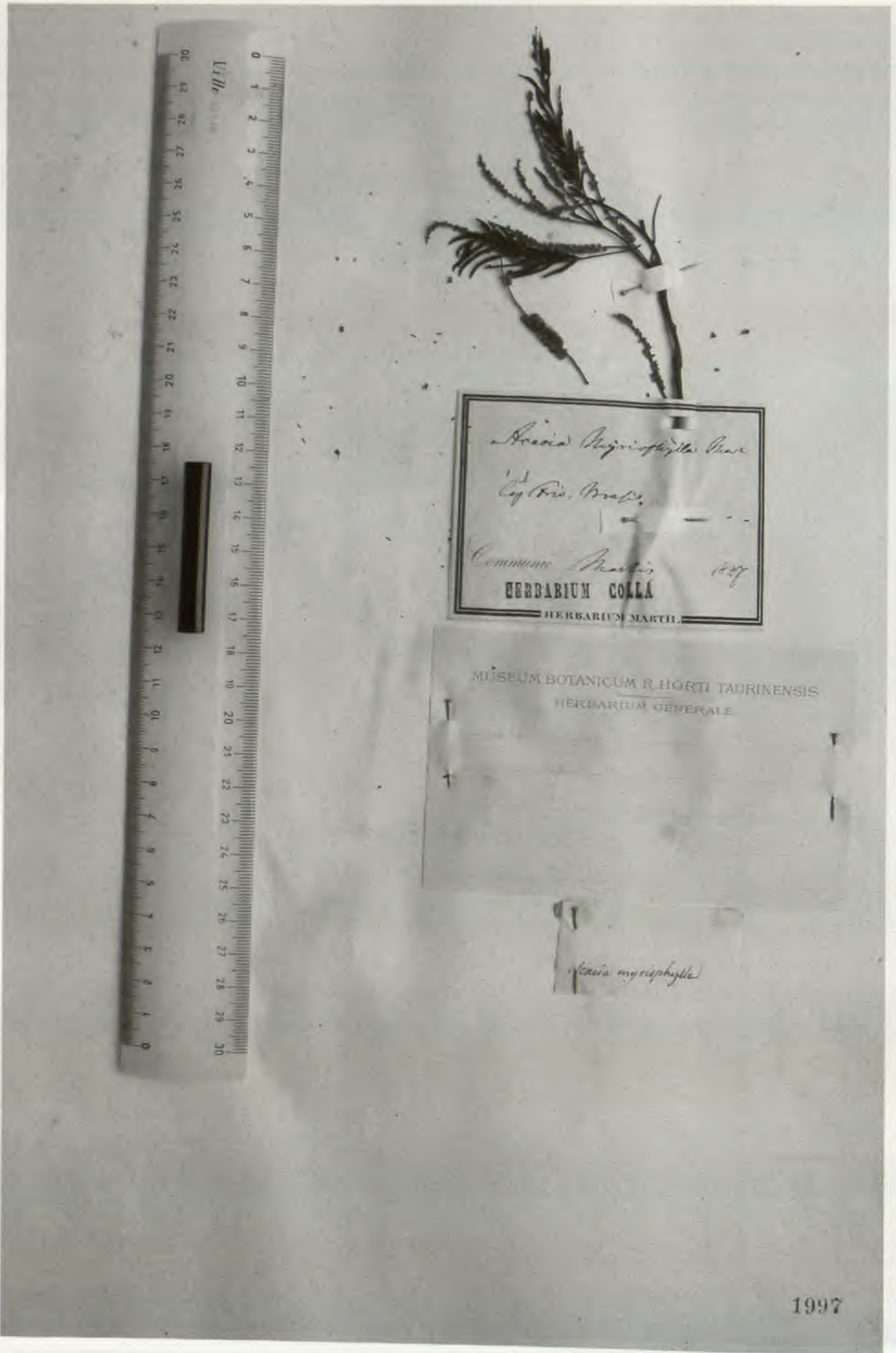


Fig. 8. Lectotype type of *Acacia mollicoma* Mart. in Colla.



1997

FIG. 9. Lectotype of *Acacia myriophylla* Mart. in Colla.

or possibly even 5) indicates that this species belongs to the Mimoseae, perhaps to the genera *Parapiptadenia* or *Pseudopiptadenia* (Fig. 10).

10. *Acacia plumosa* Mart. ex Colla. Herb. pedem. 2:267, Jul 1834. (Fig. 11). TYPE: BRAZIL: "Acacia / Villa Nova do Vermehr Brasil / A. plumosa Colla / communic. Martius 1827" (LECTOTYPE, here designated: TO).

Notes.—Probably *Piptadenia trisperma* (Vell.) Benth.

Specimens examined: Two labels: hw. Martius, "Acacia / Villa Nova do Vermehr Brasil / A. plumosa Colla / communic. Martius 1827." On the reverse side of this label, the description that appears in Colla (1834b) is written in Colla's handwriting (Seigler et al. 2006a; Rico-Arce 2007); hw. Colla "Acacia plumosa."

This specimen has spicate inflorescences and prickles, some of which appear to be paired at the nodes, but are also scattered on the petioles. The glands are depressed at the base of the petioles. Leaflet venation is more or less central. These characters are quite similar to those of *Piptadenia trisperma* (Vell.) Benth.

Although Colla's handwritten label gives the name *Acacia plumosa* on the label written by Martius, the description written on the reverse side of the Martius label (Colla 1834b) agrees more closely with the type of *Acacia angico* Martius in Colla (see above). Because Colla did provide a Latin binomial and at least a generally accurate description and diagnosis, *Acacia plumosa* was validly and effectively published. Further, the specimen at TO represents materials seen by Colla and we designate that specimen as a lectotype for the species. Because the name of the species follows the type specimen, not the accuracy of the description, that name must be accepted.

The fact that Bentham (1876) considered *Acacia angico* Martius to be a synonym of *Piptadenia rigida* Bentham (1842) [now recognized as *Parapiptadenia rigida* (Benth.) Brenan (1963)] and a Martius specimen of authentic *Acacia angico* at Kew (K264972), labeled as such in Martius' handwriting and apparently identical to material seen by Colla at TO was annotated by Bentham as *Acacia plumosa* Lowe suggests that Bentham was influenced by Colla's descriptions, although Colla was not cited.

11. *Acacia pterocarpa* Bertero in Colla, Herb. pedem. 2:265. 1834. (Fig. 12). TYPE: "Acacia pterocarpa ? / e sem. Miss. A Bertero e Duad. ? / Lam. [two unreadable words] / Ex hort. Rip. 1829 / non videtur differre a Leucocephala et glauca / a nobis cultis" (LECTOTYPE, here designated: TO).

Notes.—The name is presently a heterotypic synonym of *Leucaena leucocephala* (Lam.) de Wit, Taxon 10:53. 1961.

Specimens examined: Two labels: hw. Colla "Acacia pterocarpa ? / e sem. Miss. A aBertero e Guad. ? / Lam. [two unreadable words] / Ex hort. Rip. 1829 / non videtur differre a Leucocephala et glauca / a nobis cultis," hw. Colla "Acacia pterocarpa."

12. *Acacia ramosissima* Mart. in Colla, Herb. pedem. 2:268. 1834. (Fig. 13). TYPE: BRAZIL: "In sylvis praemitivis Brasil / Communic. Martius 1827" (LECTOTYPE, here designated: TO).

Notes.—Probably a *Mimosa* species.

Specimens examined: Two labels: hw. Martius, "In sylvis praemitivis Brasil / Communic. Martius 1827;" hw. Colla, "Acacia ramosissima."

There are no petiolar glands. The number of stamens varies from 7–9. This species might possibly be *Piptadenia ramosissima* (Bentham 1842; Lewis 1987), but alternatively could be a *Mimosa* species.

13. *Acacia rubiginosa* Martius in Colla, Herb. pedem. 2:268. 1834. (Fig. 14). TYPE: BRAZIL: "Mimosa / Campos des Looglorasen Brasil / Communic. Martius 1827," (LECTOTYPE, here designated: TO). On label: *Mimosa* [hw. Martius]. *Acacia rubiginosa* Colla [hw. Colla].

Notes.—A *Mimosa* sp.

Specimens examined: Three labels: hw. Martius, "Mimosa / Campos des Looglorasen Brasil / Communic. Martius 1827." On the reverse side of this label, the description that appears in Colla (1834b) is written in Colla's handwriting; hw. unknown, "Mimosa / Campos dos Loaglasen;" hw. Colla, "Acacia rubiginosa."

This specimen may have been collected at Campos de Goytacazes or Goitacazes (Goytacasen in German), a locality in the northeastern part of present-day Rio de Janeiro, Brazil. Based on the image of the specimen and a later figure (Colla 1837, tab. 62, fig. 2; Fig. 10)) this is clearly a *Mimosa* species and resembles *Mimosa pellita* Humb. & Bonpl. ex Willd., but cannot be ascribed to that species with certainty. Other possible, but less likely, species might be *M. tarda* Barneby or *M. elliptica* Benth. (Barneby 1991).

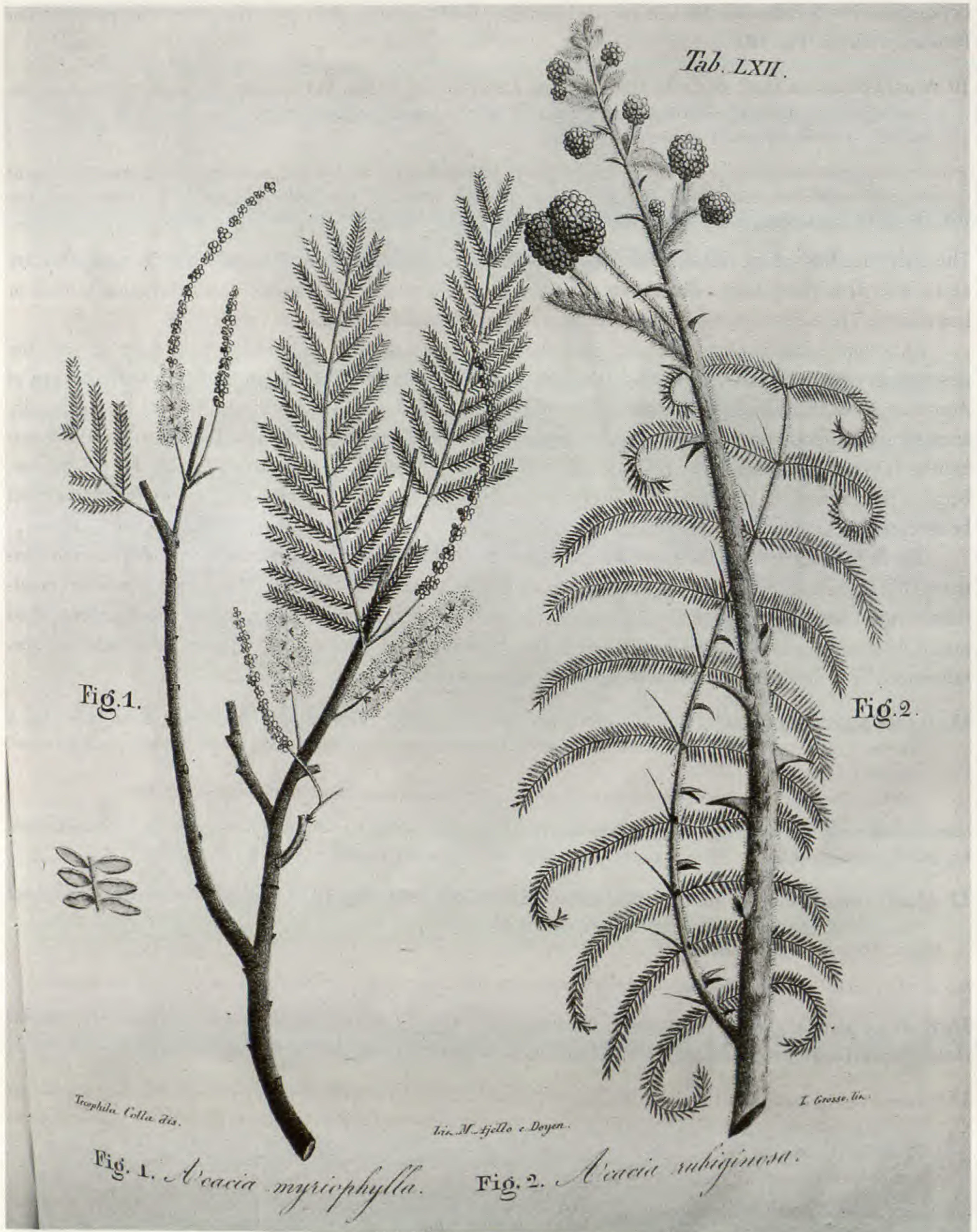


FIG. 10. Plate of *Acacia myriophylla* Mart. in Colla and *A. rubiginosa* Mart. in Colla In: L. Colla, *Herbarium Pedemontanum*, Torino, 1837, vol. 8, tab. 62.

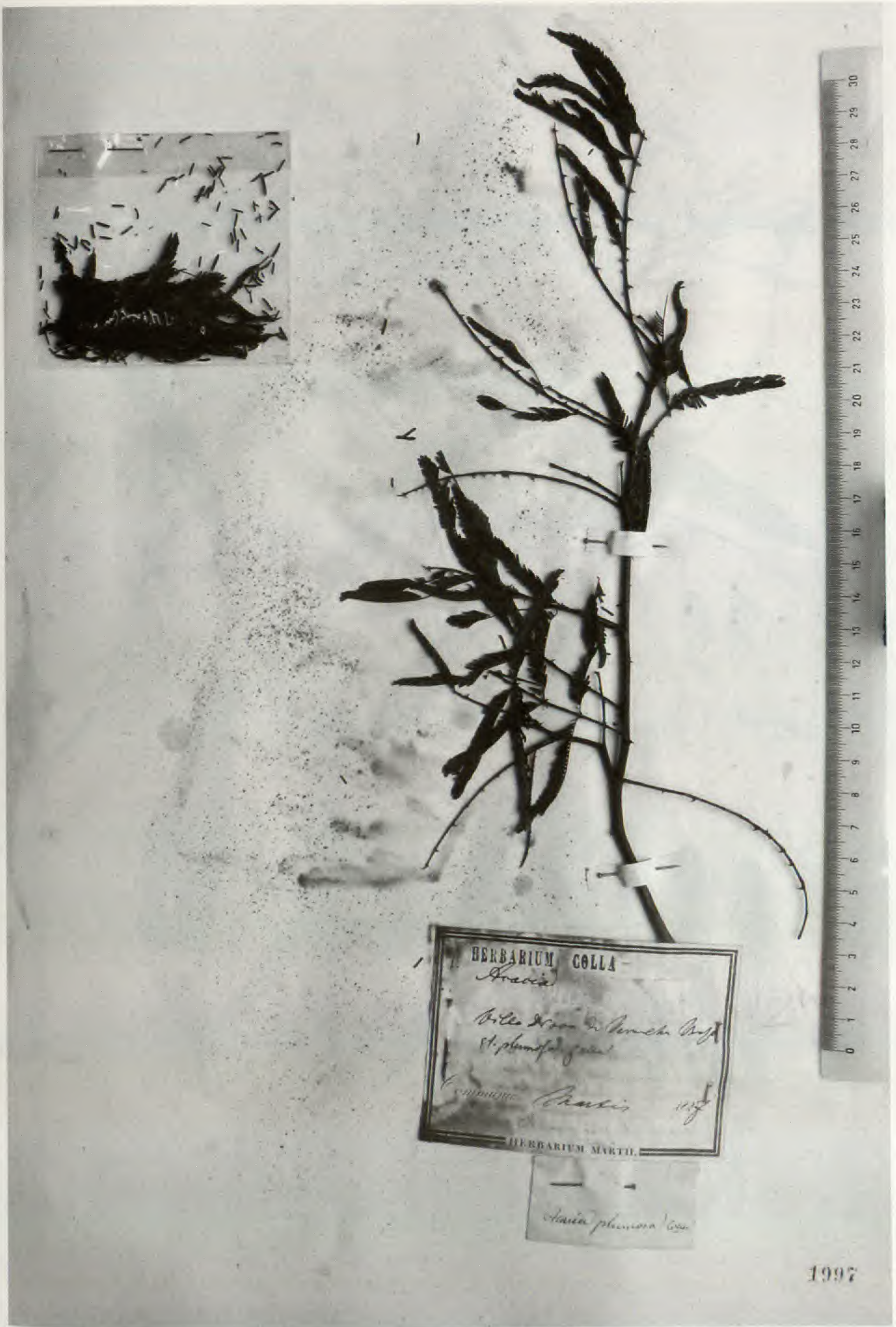


Fig. 11. Lectotype of *Acacia plumosa* Mart. ex Colla.

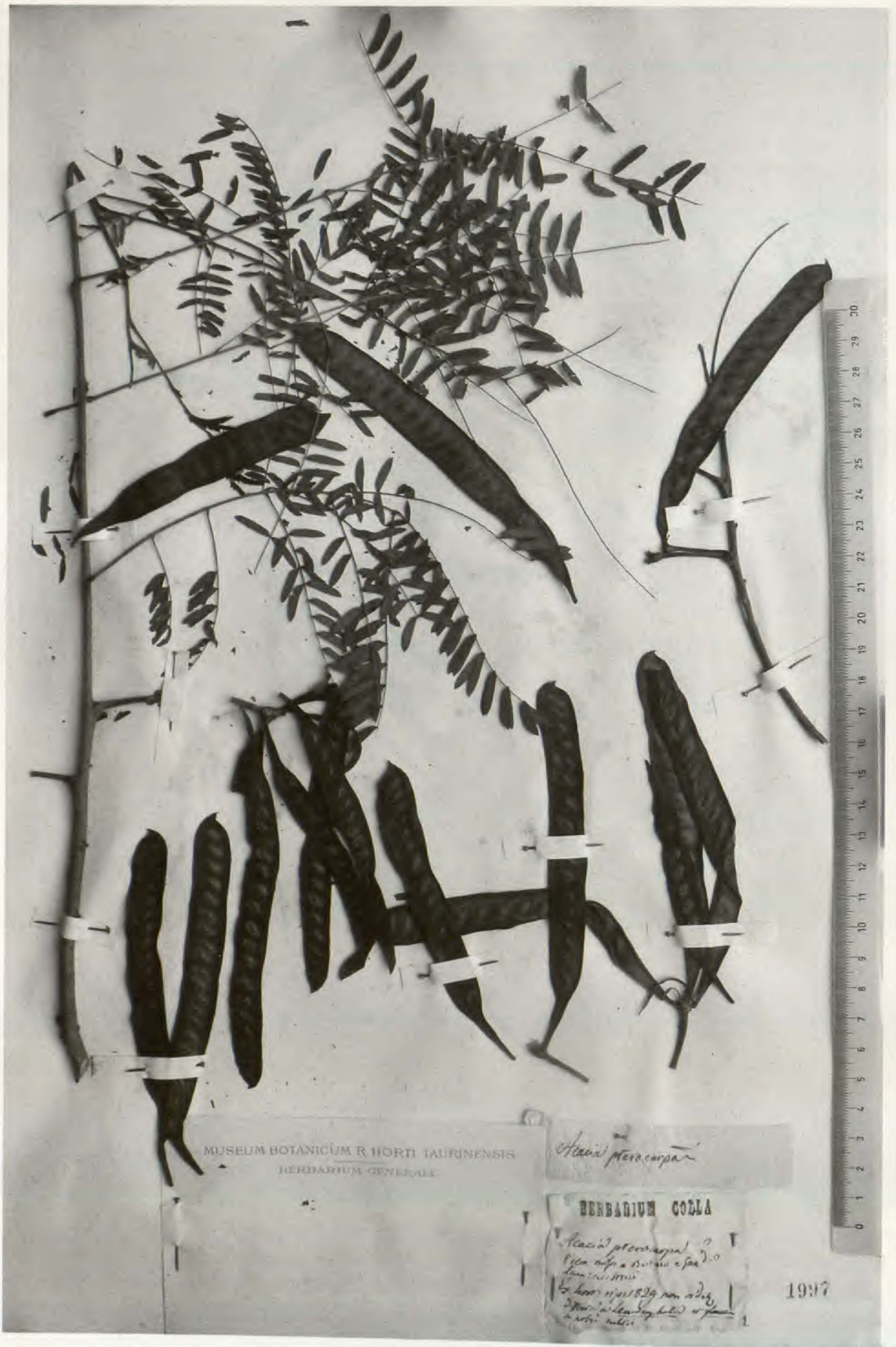


FIG. 12. Lectotype of *Acacia pterocarpa* Bertero in Colla.

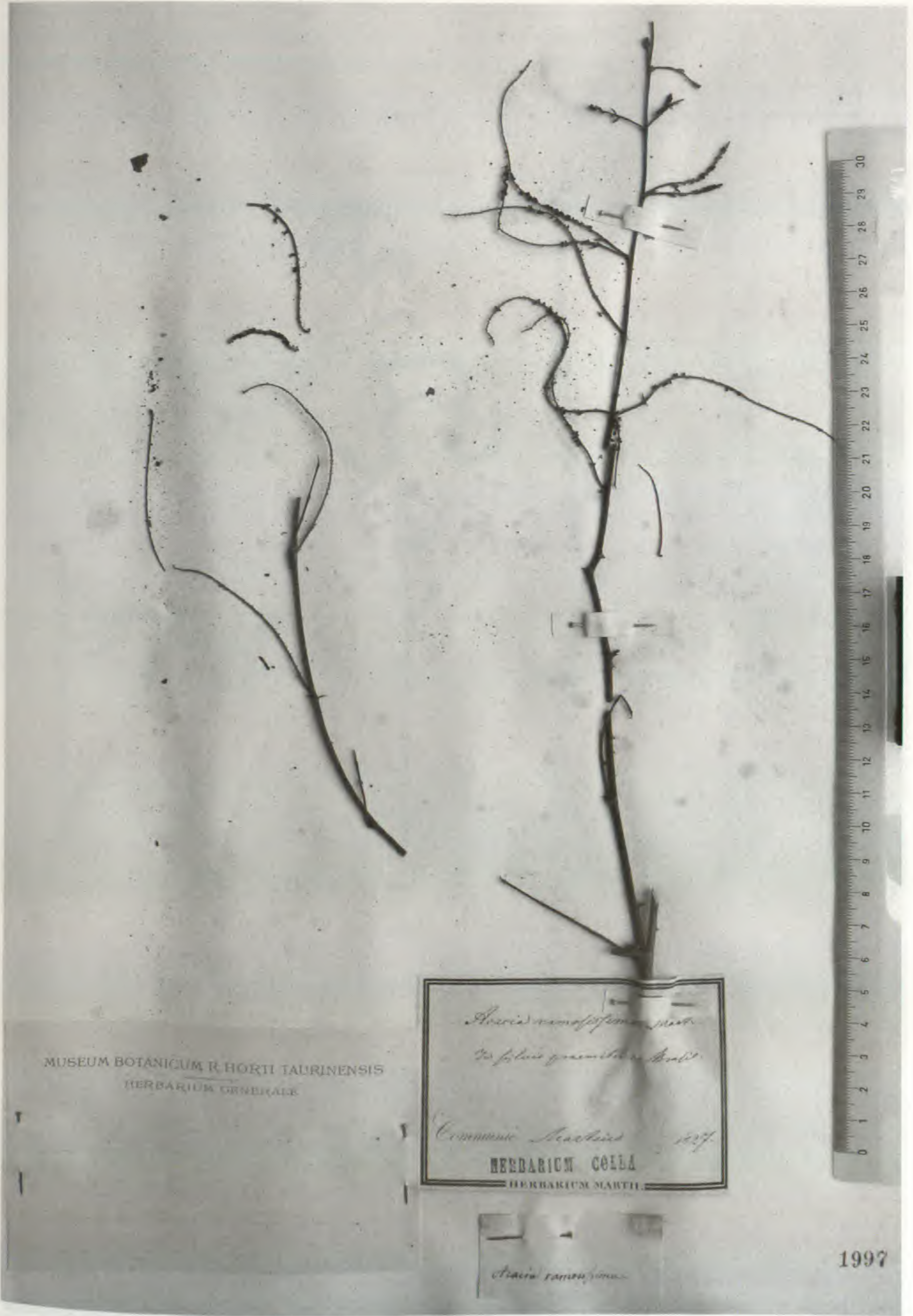


FIG. 13. Lectotype of *Acacia ramosissima* Mart. in Colla.

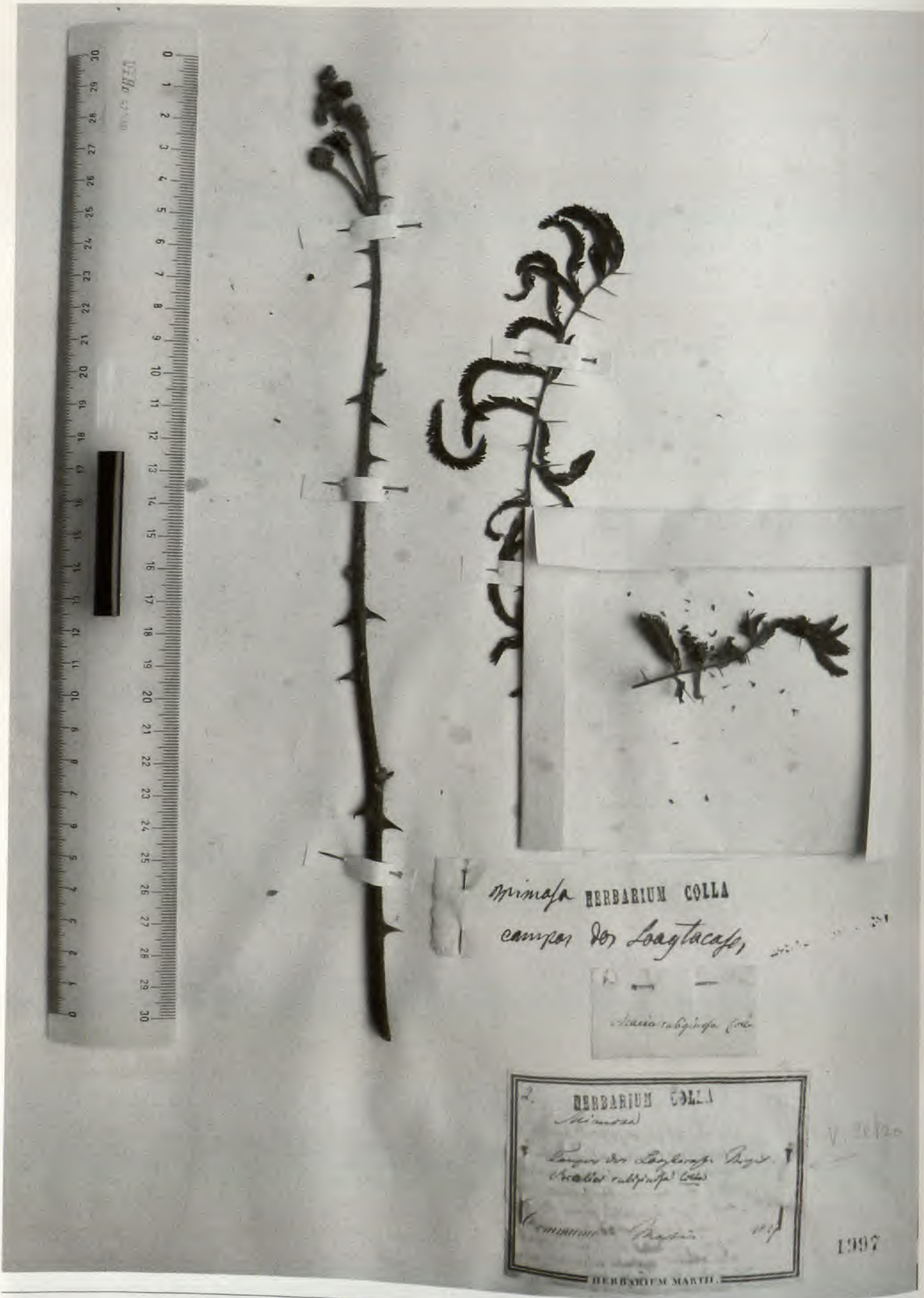


FIG. 14. Original materials of *Acacia rubiginosa* Mart. in Colla.

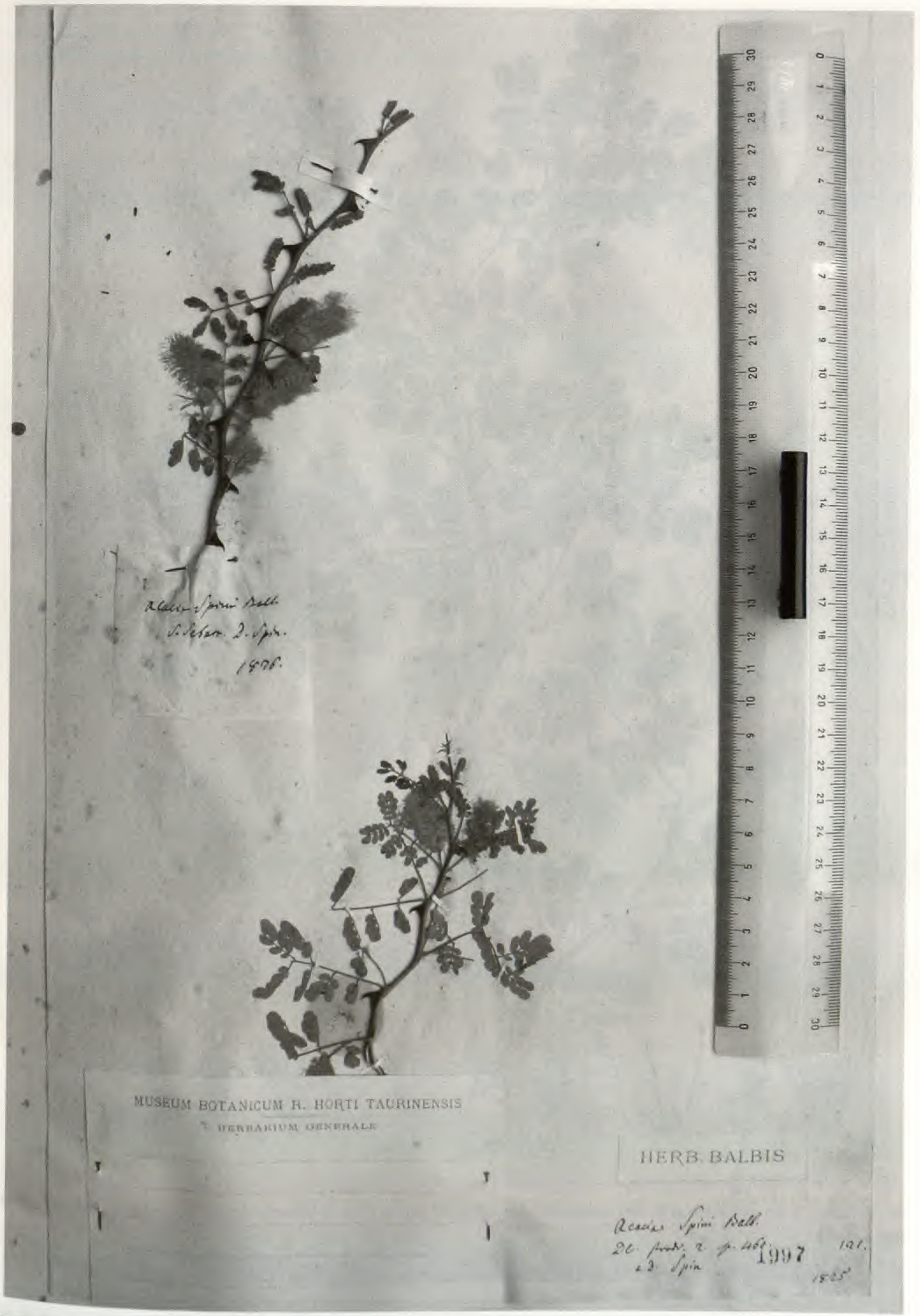


Fig. 15. Neotype of *Acacia spini* Balbis ex De Spin (upper left).

Tab.V.



FIG. 16. Plate of *Acacia spini* Balbis ex De Spin. *Iconographia Taurinensis*. Vol. 51 (s.d.), tab. 10 (Library of Department of Life Sciences and Systems Biology, Torino).

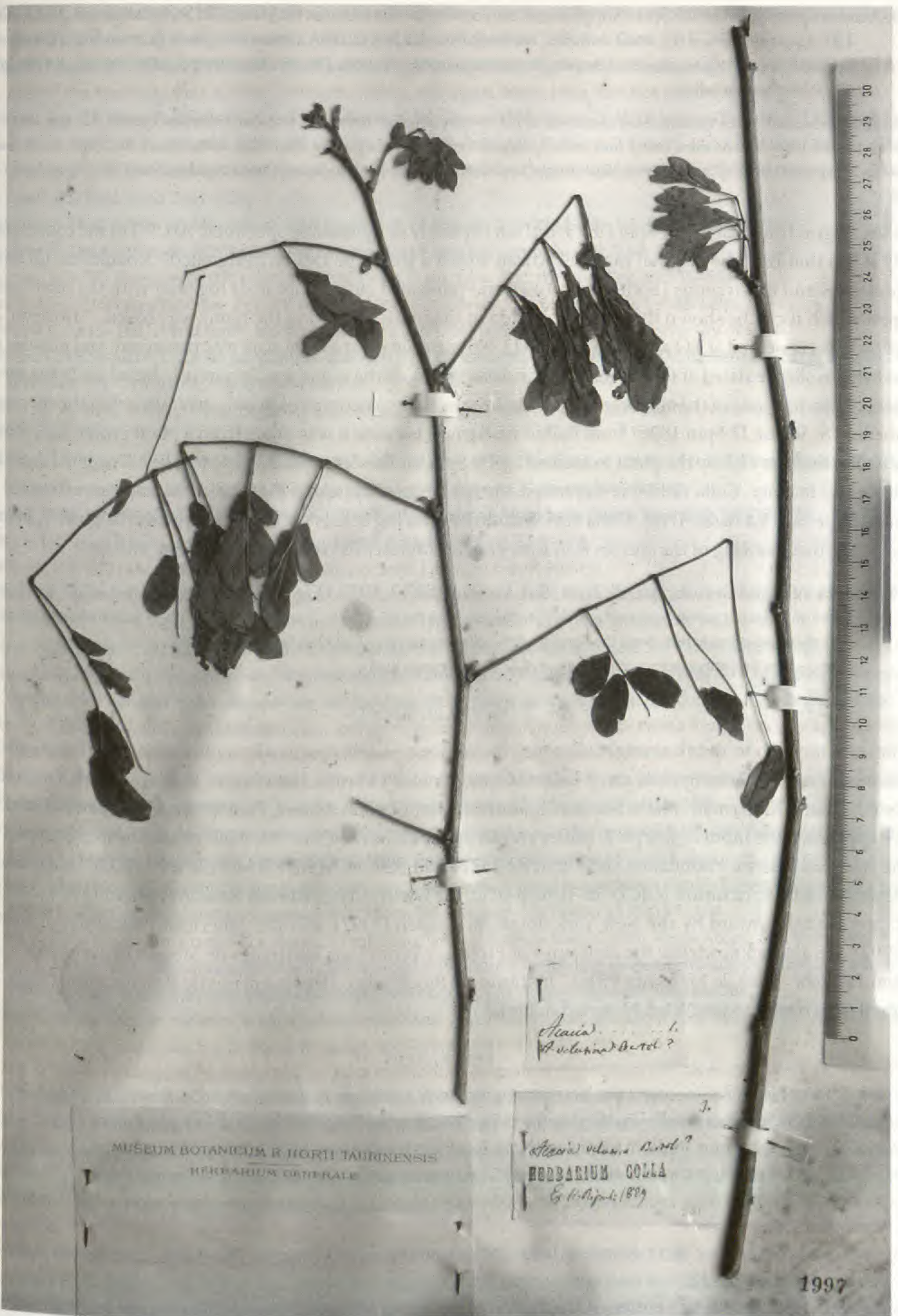


Fig. 17. Original materials of *Acacia velutina* Bertol.

14. *Acacia spini* Balb. ex De Spin, Supplément au Catalogue des Plantes du Jardin de St. Sébastien 8. 1823. (**Fig. 15**). *Acacia semispinosa* (L.) Willd. ex Steud., Nomencl. Bot. ed. 2, 8, 149. 1841. *Mimosa semispinosa* L., Sp. pl. 522. 1753. *Mimosa distachya* Cav. var. *oligacantha* (DC.) Barneby, *Sensitivae Censitae* 777. 1991. TYPE: "S. Sebast. D. Spin 1826" (NEOTYPE, here designated: TO, herbarium Balbis).

Specimens examined: Seven specimens are conserved in TO. Two are in Balbis' herbarium from San Sebastiano garden: "D. Spin 1825," "S. Sebast. D. Spin 1826" (on the same sheet); four are in Colla's collection from his garden: "Ex H. Rip. 1826," "Ex H. Rip. 1829" (on the same sheet), "H. Rip. Sept. 1826," "Ex H. Rip. Oct. 1831" (on the same sheet), and the last is in Bruno's herbarium but from Colla: "Ex H. Ripul. Oct. 1829."

In the original publication De Spin (1823) did not explicitly designate any specimen. Art. 9.2 of the code explicitly states that the "the original material" (from which a lectotype can be designated) "comprises: (a) those specimens and illustrations (both unpublished and published either prior to or together with the protologue) upon which it can be shown that the description or diagnosis validating the name was based..." However, all specimens conserved at TO are dated after 1823. No material prior to that date was preserved, and possibly no herbarium sheet existed at the moment of the description, as the name was apparently based on living specimens. Therefore, one of the cited specimens can be selected as a neotype of *Acacia spini*. We select the specimen labelled "S. Sebast. D. Spin 1826" from Balbis' herbarium because it was taken from a plant grown in S. Sebastiano Po, thus very likely the plant examined by De Spin for the description. Type locality: De Spin did not indicate any locality. Colla (1829) re-described the species and indicated that the seeds had been collected in Guadalupe near La Basse-Terre. Colla also included a drawing of this species made by his daughter T. Billotti (t. 5). Another drawing of the species is in *Iconographia Taurinensis* (vol. 51, tab. 10) (**Fig. 16**).

15. *Acacia velutina* Bertol., Syll. Pl. Hort. Bot. Bonon. 1827:3. 1827. (**Fig. 17**). Nom. illeg. non DeCandolle (1825). TYPE: Based on materials grown from seed sent by C.G. Bertero from the West Indies. Mabberley (1980, 1983) indicated that a specimen with these same data at BOLO was the type for a *Pithecellobium* species. (Colla 1834b; Bertoloni 1838).

Notes.—Now probably a heterotypic synonym of *Zapoteca formosa* Kunth.

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REFERENCES

- ALLIONI, C. 1785. *Flora Pedemontana sive enumeratio methodica stirpium indigenarum Pedemontii*. I.M. Briolus, Torino.
- BALBIS, G.B. 1801. *Synopsis plantarum Horti Botanici Taurinensis anno Reip. Gall. X (1801 v.s.) s.n.*, Torino.
- BALBIS, G.B. 1812. *Catalogus stirpium Horti Academici Taurinensis ad annum MDCCCXII*. V. Bianco, Torino.
- BALBIS, G.B. 1813. *Catalogus stirpium Horti Academici Taurinensis ad annum MDCCCXIII*. V. Bianco, Torino.
- BALBIS, G.B. 1827–1828. *Flore Lyonnaise, ou description des plantes qui croissent dans les environs de Lyon et sur le Mont-Pilat*. Coque, Lyon.
- BALDINI R. AND L. GUGLIELMONE. 2012. Historical botanical collections in Latin America: The Italian contribution in the XIX century. *Webbia* 67:3–22.
- BARNEBY, R.C. 1991. *Sensitivae Censitae*. A description of the genus *Mimosa* (Linnaeus) Mimosaceae in the New World. *Mem. New York Bot. Gard.* 65:1–835.
- BARNEBY, R.C. 1998. Silk tree, Guanacaste, Monkey's Earring. A generic system for the synandrous Mimosaceae of the Americas. Part 3. *Calliandra*. *Mem. New York Bot. Gard.* 74:1–223.

- BARNEBY, R.C. AND J.W. GRIMES. 1996. Silk tree, Guanacaste, Monkey's Earring. A generic system for the synandrous Mimosaceae of the Americas. Part 1. *Abarema*, *Albizia*, and allies. Mem. New York Bot. Gard. 74:1–292.
- BARNEBY, R.C. AND J.W. GRIMES. 1997. Silk tree, Guanacaste, Monkey's Earring. A generic system for the synandrous Mimosaceae of the Americas. Part 2. *Pithecellobium*, *Cojoba*, and *Zygia*. Mem. New York Bot. Gard. 74:1–161.
- BARNEBY, R.C., P.E. BERRY, D. BRUNNER, L. CÁRDENAS, E. FORERO, J.W. GRIMES, H.C.F. HOPKINS, E.M. DE LAMARE OCCHIONI, G. DE MARTINO, AND O. PONCY. 2007. Leguminosae-Mimosoideae. In: V. Funk, T. Hollowell, P. Berry, C. Kelloff, and S.N. Alexander. Checklist of the plants of the Guiana Shield (Venezuela: Amazonas, Bolivar, Delta Amacuro, Guyana, Surinam, French Guiana). Contr. U.S. Natl. Herb. 55:1–584.
- BENTHAM, G. 1842. Notes on Mimoseae, with a synopsis of species. London J. Bot. 1:318–392, 494–528.
- BENTHAM, G. 1844. Notes on Mimoseae, with a synopsis of species. London J. Bot. 3:83–112.
- BENTHAM, G. 1875. Revision of the suborder Mimoseae. Trans. Linn. Soc. London, Bot. 30:335–664.
- BENTHAM, G. 1876. Leguminosae. In: C.F.P. Martius. Flora Brasiliensis 15(1): 1–527, Tab. 1–138. Leipzig.
- Bertero, C. 1816–1821. Field book. Manuscript in the Dept. of Plant Biology Library, University of Turin.
- BERTERO, C. 1828–1829. Lista de las plantas que han sido observadas en Chile por el Dr. Bertero en 1828. El Mercurio Chileno 4:194–195 (1828), 12:551–564 (1829).
- BERTOLONI, A. 1838 [1839]. Horti botanici Bononiensis plantae viventes cum aliis plantis viventibus commutandae 1:1–40, 1–5 pl.
- BOGGAN, J., V. FUNK, C. KELLOFF, M. HOFF, G. CREMERS, AND C. FEUILLET. 1997. Checklist of plants of the Guianas. Second Edition. Centre for the Study of Biological Diversity, University of Guyana, Georgetown, Guyana.
- BRENAN, J.P.M. 1963. Notes on Mimosoideae. VIII. A further note on *Piptadenia* Benth. Kew Bull. 17:227–228.
- BRITTON, N.L. AND J.N. ROSE. 1928. Mimosaceae. North American Flora. 23:1–194.
- BRUMMITT, R.K. 2011. *Acacia*: do we want stability or total change? Taxon 60:915.
- BURKART, A. 1979. Leguminosae Mimosoideae, Part 1. In: P.R. Reitz, ed. Flora Illustrada Catarinense. Itajai, Brazil.
- CHIAPUSSO VOLI, I. 1904. Appunti intorno all'Iconographia Taurinensis. 1752–1868. Malpighia 18:293–343.
- COLLA, L. 1820. Memoria sul genere *Musa* e monografia del medesimo. Atti R. Accad. Sci. Torino 25:333–402.
- COLLA, L. 1824. Hortus Ripulensis seu enumeratio plantarum quae Ripulis coluntur ab Aloysio Colla, additis stirpium rariorum, vel nondum satis cognitarum, aut forte novarum notis, descriptionibus, et iconibus. Typ. Regia, Torino.
- COLLA, L. 1827a. Aloysii Colla illustrationes et icones rariorum stirpium quae in ejus Horto Ripulis florebant, anno 1824, addita ad Hortum Ripulensem. Appendice I. Mem. Reale Accad. Sci. Torino 31(1):111–138.
- COLLA, L. 1827b. Aloysii Colla illustrationes et icones rariorum stirpium quae in ejus Horto Ripulis florebant, anno 1825, addita ad Hortum Ripulensem. Appendice II. Mem. Reale Accad. Sci. Torino 31(1):319–358.
- COLLA, L. 1829. Aloysii Colla illustrationes et icones rariorum stirpium quae in ejus Horto Ripulis florebant, anno 1826, addita ad Hortum Ripulensem. Appendice III. Mem. Reale Accad. Sci. Torino 33(1):113–166.
- COLLA, L. 1831. Aloysii Colla illustrationes et icones rariorum stirpium quae in ejus Horto Ripulis florebant, anno 1827–28, addita ad Hortum Ripulensem. Appendice IV. Mem. Reale Accad. Sci. Torino 35 (1):147–204.
- COLLA, L. 1833. Elogio storico dell'Accademico Professore Giovan Battista Balbis. Mem. Reale Accad. Sci. Torino 36:27–54.
- COLLA, L. 1833–1837. Herbarium Pedemontanum juxta methodum naturalem dispositum, additis nonnullis stirpibus exoticis ad universos ejusdem methodi ordines exhibendos. Typ. Regia, Augustae Taurinorum.
- COLLA, L. 1834a. Plantae rariores in regionibus chilensibus a clarissimo M.D. Bertero nuper detectae et ab A. Colla in lucem editae. Fasciculus I. II. III. Mem. R. Accad. Sci. Torino 37:41–85.
- COLLA, L. 1834b. Herbarium Pedemontanum juxta methodum naturalem dispositum additis nonnullis stirpibus exoticis ad universos ejusdem methodi ordines exhibendos. Typ. Regia, Torino, vol. 2:1–557.
- COLLA, L. 1837. Herbarium Pedemontanum juxta methodum naturalem dispositum additis nonnullis stirpibus exoticis ad universos ejusdem methodi ordines exhibendos. Typ. Regia, Torino, vol. 8.
- DECANDOLLE, A.P. DE. 1825. *Acacia*. Prodrômus systematis naturalis regni vegetabilis. 2:448–473. Paris.
- DECANDOLLE, A.P. DE. 1831. Nécrologie. Mort de G.B. Balbis. Bibliothèque Universelle des Sciences, Belle-Lettres et Arts 46:214–217.
- DELPONTE, G.B. 1852. Elogio storico di Luigi Colla. Mem. R. Accad. Sci. Torino, ser. 2, 12:1–38.
- DELPRETE, P.G., G. FORNERIS, AND A. PISTARINO. 2002. Carlo Bertero (1789–1831) in the New World. Sida 20:621–644.
- DE SPIN. 1804. See Novarina di Spigno, L. 1804
- DE SPIN. 1818. See Novarina di Spigno, L. 1818
- DE SPIN. 1823. See Novarina di Spigno, L. 1823

- FORNERIS, G. 2008. L'Iconographia Taurinensis (1752–1868): restauro e valorizzazione scientifica della collezione. *Museol. Sci., Mem.* 2:119–128.
- FORNERIS, G., L. GUGLIELMONE, AND G. PANDOLFO. 2008. L'Erbario dell'Università di Torino: risultati preliminari del censimento delle collezioni fanerogamiche. *Museol. Sci., Mem.* 2:95–101.
- FORNERIS, G. AND F. MONTACCHINI. 1984. Raccolte botaniche delle spedizioni del Duca degli Abruzzi. In: A. Audisio, ed. Dal polo al K2. Sulle orme del Duca degli Abruzzi, 1899–1954. *Cahier Museomontagna* 31:133–148. Museo Nazionale della Montagna "Duca degli Abruzzi," Torino.
- FORNERIS, G. AND A. PISTARINO. 1990. Note biografiche e attività scientifica di G.B. Balbis (1765–1831): opere, erbario e documentazione bibliografica. *Museol. Sci.* 7:201–257.
- FREYLINO, L. DE. 1785. *Enumeratio plantarum quae prostant in Horto Botanico Butilerae Astensis Comitum Freylini [...] juxta Caroli Linnaei sexuale sistema disposita.* Typ. Fontana, Taurini.
- FREYLINO, L. DE. 1808. *Enumeratio plantarum quae in Horto Botanico Laurentii Freylini seminatur Buttilerae 1808.* Manuscript.
- FREYLINO, L. DE. 1810. *Catalogue des plantes cultivées dans le jardin de Buttigliera (Marengo) par M.r de Freylin.* Impr. Sociale, Torino.
- FRYXELL, P.A. 1976. On some Brazilian Malvaceae of Martius, published by Colla in 1833. *Taxon* 25:589–593.
- GUGLIELMONE, L. 2004. Emilio Chiovenda (1871–1941) and the Herbarium of the University of Turin. In: L. Russo, ed. *The succulent plants of Eastern Africa: Proceedings of the International Symposium: The succulent plants of Eastern Africa: history, botanical exploration and research, Verbania, 20–22 September 2002.* AIAS, Roma. Pp. 234–251.
- GUGLIELMONE, L. 2008. Giovanni Biroli botanico: i rapporti con l'Orto botanico di Torino, le opere, la collezione di essiccata. In: S. Bartoli (a cura di). *Palazzi storici della Provincia di Novara. Palazzi del sapere: Giovanni Biroli e la Novara napoleonica.* Interlinea, Novara. Pp. 103–159.
- GUGLIELMONE, L., I. BENIAMINO, AND G. FORNERIS. 2006. Luigi Raimondo Novarina di Spigno (1760–1832): le testimonianze della sua attività nell'Erbario dell'Università di Torino. *Museol. Sci.* 21:329–358.
- GUGLIELMONE, L., G. PANDOLFO, AND R. CARAMIELLO. 2009. Le raccolte botaniche di Giovanni Casaretto in Brasile (1838–1840) documentate nell'Erbario dell'Università di Torino. *Atti del XVII Congresso ANMS—Al di là delle Alpi e del Mediterraneo—Verona, 4–7 Dicembre 2007.* *Museologica Scientifica, Mem.* 4:172–173.
- GUILLEMIN, J.B.A. 1836. *Zephyritis Taitensis – Énumération des plantes découvertes par les voyageurs, dans les Iles de la Société, principalement dans celle de Taïti.* *Ann. Sci. Nat., Bot.* 6:297–320.
- GUILLEMIN, J.B.A. 1837. *Zephyritis Taitensis – Énumération des plantes découvertes par les voyageurs, dans les Iles de la Société, principalement dans celle de Taïti.* *Ann. Sci. Nat., Bot.* 7:177–192, 241–255, 349–370.
- HERNÁNDEZ, H.M. 1986. *Zapoteca*: A new genus of neotropical Mimosoideae. *Ann. Missouri Bot. Gard.* 73:755–763.
- HERNÁNDEZ, H.M. 1989. Systematics of *Zapoteca* (Leguminosae). *Ann. Missouri Bot. Gard.* 76:781–862.
- HOCHSTETTER, C. F. AND E. STEUDEL, 1840. Notice of the Wurtemberg Unio Itineraria. *Journ. Bot. (Hooker)* 3: 303–307.
- KODELA, P.G. AND P.G. WILSON. 2006. New combinations in the genus *Vachellia* (Fabaceae: Mimosoideae) from Australia. *Telopea.* 11:233–244.
- KUNTH, C.S. 1823 [1824]. *Nova genera et species plantarum.* (quarto ed.) 6:1–542, 87 figures.
- KUNTH, C.S. 1825 [1826]. *Synopsis plantarum Aequinoctialium Orbis Novi.* 4: Paris, apud F.G. Levrault.
- LEWIS, G.P. 1987. *Legumes of Bahia.* Royal Botanical Gardens, Kew.
- LINDER, H.P. AND M. CRISP. 2011. The fate of *Acacia*. *Taxon* 60:570–571.
- LUCKOW, M., C. HUGHES, B. SCHRIRE, P. WINTER, C. FAGG, R. FORTUNATO, J. HURTER, L. RICO, F.J. BRETILER, A. BRUNEAU, M. CACCAVARI, L. CRAVEN, M. CRISP, A.S. DELGADO, S. DEMISSEW, J.J. DOYLE, R. GREYER, S. HARRIS, P.S. HERENDEEN, H.M. HERNÁNDEZ, A.M. HIRSCH, R. JOBSON, B.B. KLITGAARD, J.-N. LABAT, M. LOCK, B. MACKINDER, B. PFEIL, B.B. SIMPSON, G.F. SMITH, M.S. SOUSA, J. TIMBERLAKE, J.G. VAN DER MAESEN, A.E. VAN WYK, P. VORSTER, C.K. WILLIS, J.J. WIERINGA, AND M.F. WOJCIECHOWSKI. 2005. *Acacia*: the case against moving the type to Australia. *Taxon* 54:513–519.
- MABBERLEY, D.J. 1980. Catalogues with particular reference to Hortus Malabaricus. In: K.S. Manilal, ed. *Botany and history of Hortus Malabaricus.* 90–91, 102–105. Oxford and IBH Publishing Company.
- MABBERLEY, D.J. 1981. Edward Nathaniel Bancroft's obscure botanical publications and his father's plant names. *Taxon* 30:7–17.
- MABBERLEY, D.J. 1983. Dr. Smith's *Anemia*, or, the prevention of later homonyms. *Taxon.* 32:79–87.
- MANIERO, F. 2000. *Fitocronologia d'Italia.* Olschki, Firenze.
- MARTIUS, C.F.P. VON. 1843. *Systema materiae medicae vegetabilis Brasiliensis.* Lipsiae.

- MASLIN, B.R., J.T. MILLER, AND D.S. SEIGLER. 2003. Overview of the generic status of *Acacia* (Leguminosae: Mimosoideae). *Austral. Syst. Bot.* 16:1–18.
- MATTIROLO, O. 1911. Nuovi materiali scientifici pervenuti in dono al R. Istituto botanico di Torino. 1903–1910. *Bull. Soc. Bot. Ital.* 3:30–37.
- MATTIROLO, O. 1929. Cronistoria del dell'Orto Botanico della Regia Università di Torino. In: Studi sulla vegetazione nel Piemonte pubblicati a ricordo del II Centenario della fondazione dell'Orto Botanico della R. Università di Torino. Checchini, Torino: V–CXL.
- MATTIROLO, O. 1932. Nel I Centenario della tragica scomparsa del celebre botanico-esploratore medico Carlo Bertero di Santa Vittoria d'Alba (1831–1931). *Mem. R. Accad. Sci. Torino, ser. 2*, 67:1–21.
- MCNEILL, J.S. AND N.J. TURLAND. 2011. The conservation of *Acacia* with *A. penninervis* as conserved type. *Taxon* 59:1–4.
- MCNEILL, J., ET AL. 2005. Nomenclature section proceedings and appointments. *Taxon* 54:1057–1064.
- MOORE, G. 2007. The handling of the proposal to conserve the name *Acacia* at the 17th International Botanical Congress: An attempt at minority rule. *Bothalia* 37:109–118.
- MOORE, G. 2008. Action on the proposal to conserve the name *Acacia* at the Nomenclature Section of the XVII International Botanical Congress in Vienna: Did the ayes have it? *Linnean* 24:16–20.
- MOORE, G., G.F. SMITH, E. FIGUEIREDO, S. DEMISSEW, G. LEWIS, B. SCHRIRE, L. RICO, AND A.E. VAN WYK (AND 61 OTHER AUTHORS). 2011a. *Acacia*, the 2011 Nomenclature Section in Melbourne, and beyond. *Taxon* 59:1188–1195.
- MOORE, G., G.F. SMITH, E. FIGUEIREDO, S. DEMISSEW, G. LEWIS, B. SCHRIRE, L. RICO, A.E. VAN WYK, M. LUCKOW, R. KIESLING, AND M. SOUSA S. 2011b. The *Acacia* controversy resulting from minority rule at the Vienna Nomenclature Section: Much more than arcane arguments and complex technicalities *Taxon* 3:852–857.
- MOORE, A. AND F.P.D. COTTERILL. 2011. The *Acacia* retypification debate: Perspectives of African amateur botanists. *Taxon* 60:858–859.
- MORIS, G.G. 1834. *Plantae Chilenses novae vel minus cognitae. Pars I.* *Mem. Reale Accad. Sci., Torino* 37:98–109, tabs. 1–6.
- MORIS, G.G. 1835. *Plantae Chilenses novae aut minus cognitae. Pars II.* *Mem. Reale Accad. Sci., Torino* 38:43–49, tabs. 1–2.
- NOCCA, D. AND G.B. BALBIS. 1816–1821. *Flora Ticinensis, seu enumeratio plantarum quas in peregrinationes multiplicibus plures per annos solertissime in Papiensi agro peractis observavunt et collegerunt.* Capelli, Ticini.
- NOVARINA DI SPIGNO, L. 1804. *Catalogue des plantes cultivées dans le Jardin de M.r De Spin, à St. Sébastien, Département du Po.* Imprimerie Phylantropique, Turin.
- NOVARINA DI SPIGNO, L. 1818. *Le jardin de St. Sébastien, soit catalogue des plantes qu'on y cultive, avec des notes sur quelques espèces nouvelles ou peu connues, par le Marquis De Spin.* Pomba et fils, Turin.
- NOVARINA DI SPIGNO, L. 1823. *Supplément au catalogue des plantes du jardin de St. Sébastien par le Marquis De Spin.* Pomba et Fils, Turin.
- ORCHARD, A.E. AND B.R. MASLIN. 2003. Proposal to conserve the name *Acacia* (Leguminosae: Mimosoideae) with a conserved type. *Taxon* 52:362–363.
- PARLATORE, F. 1850. *Elogio storico di Luigi Colla.* Cecchi, Firenze.
- PEDLEY, L. 1978. A revision of *Acacia* Mill. in Queensland. *Austrobaileya* 1:75–234.
- PEDLEY, L. 1986. Derivation and dispersal of *Acacia* (Leguminosae), with particular reference to Australia, and the recognition of *Senegalia* and *Racosperma*. *Bot. J. Linn. Soc.* 92:219–254.
- PICHI-SERMOLLI, R.E.G. 1951. The publication-dates of Colla's "Plantae rariores in regionibus Chilensibus a clarissimo M.D. Bertero nuper detectae" and "Herbarium Pedemontanum." *Webbia* 8:123–140.
- PICHI-SERMOLLI, R.E.G. 1952. Additional notes on the publication dates of Colla's "Plantae rariores in regionibus Chilensibus a clarissimo M.D. Bertero nuper detectae." *Webbia* 8:407–411.
- RICO-ARCE, M. DE L. 2001. Mimosaceae. In: W.D. Stevens, C. Ulloa, A. Pool, and O.M. Montiel, eds. *Flora de Nicaragua*. Pp. 1446–1507.
- RICO-ARCE, M. DE L. 2007. A checklist and synopsis of American species of *Acacia* (Leguminosae: Mimosoideae), CONABIO, Mexico City.
- RICO-ARCE, M. DE L. AND S. BACHMAN. 2006. A taxonomic revision of *Acaciella* (Leguminosae, Mimosoideae). *Anales Jard. Bot. Madrid* 63:189–244.
- RUCKEVORSEL, P.V. 2006. *Acacia*. What did happen in Vienna? *Anales Jard. Bot. Madrid* 63:107–110.
- SACCARDO, P.A. 1909. *Cronologia della flora italiana.* Tip. Del Seminario, Padova.
- SEIGLER D.S. AND J.E. EBINGER. 2005 [2006]. New combinations in the genus *Vachellia* (Fabaceae: Mimosoideae) from the New World. *Phytologia* 87:139–178.

- SEIGLER D.S. AND J.E. EBINGER. 2009. New combinations in the genus *Senegalia* (Fabaceae: Mimosoideae). *Phytologia* 91:25–29.
- SEIGLER D.S. AND J.E. EBINGER. 2010. New combinations in *Senegalia* and *Vachellia* (Fabaceae: Mimosoideae). *Phytologia* 92:90–93.
- SEIGLER, D.S., J.E. EBINGER, AND J.T. MILLER. 2006a. The genus *Senegalia* from the New World. *Phytologia* 87:38–93.
- SEIGLER, D.S., J.E. EBINGER, AND J.T. MILLER. 2006b. *Mariosousa*, a new segregate genus from *Acacia* s.l. (Fabaceae, Mimosoideae) from Central and North America. *Novon* 16:413–420.
- SMITH, G.F. AND E. FIGUEIREDO. 2011. Conserving *Acacia* Mill. with a conserved type: What happened in Melbourne? *Taxon* 60:1504–1506.
- SMITH, G.F., E. FIGUEIREDO, AND G. MOORE. 2010. Who amends the International Code of Botanical Nomenclature? A response to Applequist al. (2010). *Taxon* 60:213–215.
- SMITH, G.F., A.E. VAN WYK, M. LUCKOW, AND B. SCHRIRE. 2006. Conserving *Acacia* Mill. with a conserved type. What happened in Vienna? *Taxon* 55:223–225.
- SPRENGEL, C. 1826. *Systema vegetabilium*. Vol. 3, 16th edition, Gottingae.
- STAFLEU, F.A. AND R. COWAN 1976. *Taxonomic literature*. 1, Bohn, Scheltema and Holkema, Utrecht.
- STAFLEU, F.A. AND R. COWAN. 1981. *Taxonomic literature*. 3, Bohn, Scheltema and Holkema, Utrecht.
- STEUDEL, E.G. VON. 1821–1824. *Nomenclator botanicus*, I. G. Cottae, Stuttgart & Tübingen, 2 pts., 1821–24.
- STEUDEL, E.G. 1841. *Acacia*. *Nomenclator Botanicus seu Synonymia Plantarum Universalis*. Pp. 3–9.
- THIELE, K.R., V.A. FUNK, K. IWATSUKI, P. MORAT, C.-I. PENG, P.H. RAVEN, N.J. SARUKH, AND O. SEBERG. 2011. The controversy over the retypification of *Acacia* Mill. with an Australian type: A pragmatic view. *Taxon* 60:194–198.
- URBAN, I. 1902. *Symbolae Antillanae* 3:1–546.
- VASSAL, J. 1972. Apport des recherches ontogéniques et séminologiques a l'étude morphologique, taxonomique et phylogénique du genre *Acacia*. *Bull. Soc. Hist. Nat. Toulouse* 108:105–247.
- VIGNOLO-LUTATI, F. 1951. L'Herbarium generale phanerogamicum dell'Istituto Botanico dell'Università di Torino all'inizio del 1951. *Atti Acc. Sci., Torino* 85:212–222.
- VIGNOLO-LUTATI, F. 1952. L'Herbarium Pedemontanum dell'Istituto ed Orto Botanico dell'Università di Torino all'inizio del 1952. *Atti Acc. Sci., Torino* 86:155–164.
- VIGNOLO-LUTATI, F. 1955. L'opera botanica del Dott. Carlo Bertero di S. Vittoria d'Alba (1789–1831) nelle Antille e nel Sud America (1816–1821 e 1827–1831) quale risulta dalle collezioni dell'istituto ed Orto Botanico dell'Università di Torino. *Mem. Accad. Sci. Torino, ser. 3, 2(1):1–267*.
- VIGNOLO-LUTATI, F. 1956. Notizie ignorate o poco note, osservazioni e rettifiche relative all'ultimo periodo di vita ed attività botanica di Carlo Bertero. *Nuovo Giorn. Bot. Ital.* 63:679–680.
- WILDENOW, C.L. 1806. *Acacia*. *Species plantarum*. 4:1049–1093. Berlin.
- WILDENOW, C.L. 1809. *Enumeratio plantarum Horti regii Botanici Berolensis*. Berlin. In taberna Libraria Scholae reali. Pt. 2: 593–1099.
- ZULOAGA, F.O. 1999. *Catálogo de las plantas vasculares de la Argentina*. Vol. 1 and 2. Missouri Botanical Garden Press, St. Louis.